# THE AMERICAN GAS LIGHT JOURNAL

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[OFFICIAL CIRCULAR.]

## American Gas Light Association.

AMERICAN GAS LIGHT ASSOCIATION, Sept. 30th, 1885.

The Thirteenth Annual Meeting of the American Gas Light Association will be held at Cincinnati, Ohio, Wednesday, Thursday, and Friday, October 21st, 22d, and 23d. The headquarters of the Association will be at the Gibson House, and the meetings will be held at College Hall.

The members will find the hotel and hall arrangements very desirable; the hall is close by the hotel, and is a most excellent room for public meetings. The hotel has recently been remodeled, and will be found very convenient.

I am happy to be able to state that present indications would portend that our Thirteenth Annual Convention will be an enjoyable one. Certainly, those who attended our Fifth Annual Meeting, at Cincinnati in 1877, will be very ready to grant that the selection of that city for our coming convention was a happy augury of its success.

Though the literary portion of our programme is not yet completed, nevertheless the number of papers promised, and the partial pledges we have of others, afford good ground for hoping that the time which will be allotted to the consideration of matters of technical interest will be well utilized. We are promised papers on the following subjects:

"Natural Gas," by W. H. Denniston.

"Stoking Machines," by M. S. Greenough.

"Improved Furnaces," by Austin C. Wood.

"The Result of a Month's Working with Limed Coal," by James Somerville.

"The Thermophote, or Self-registering Photometer," by T. O'Conor Sloane.

"The Present State of the Gas Business," by J. C. Pratt.

"Difficulties Encountered in the Construction of a Gasholder Tank," by Emerson McMillin.

"Automatic Street Main Governors," by William Enfield.

In addition to the above we have four other papers partially promised, and I hope at an early day to add their titles to the above list.

If the members would keep these subjects before them, and collect from time to time such facts and figures in relation thereto as may be in their possession, and be prepared to lay them before the convention during the discussions of these themes, it would add greatly to the interest and value of our proceedings.

Besides the matters which will be brought before the Association by the gentlemen who will read the papers, there are many interesting subjects which could be discussed. At recent meetings of other Associations the question box has been rendered a very important feature of the convention. Yet it is doubtful if this branch of the meeting has been as edifying as it might have been; for many questions are asked which can only be properly answered by the production of some facts or figures, and as the party making the answer has no previous notice of the question it follows that the answer must be made from memory, instead of from the record; and, therefore, the conundrum is but partially answered. Now this could be rectified if we could know in advance the questions to be propounded. If, for instance, a member who wishes a subject discussed, or seeks light on some disputed point, would send in his question at once to the Secretary, he could incorporate it

in his next circular, then as the members would have an opportunity to look up definite data on the subject the chances are the party putting the question, as well as the other listeners, would be edified. I would urge this matter on the earnest consideration of the members, and I sincerely hope there will be no hesitancy on the part of all in sending in their questions at as early a day as possible to the Secretary. There need be no holding back in this matter, as the names of the propounders of the queries will not appear in any way. It will suffice if a member writes out his question and forwards it to me, I will then send to each member a list of the questions to be discussed.

Light is wanted on the following questions:

"Is cannel or naphtha the cheaper enricher, taking $9 a ton as the cost of the former and 5 cents a gallon the price of the latter?"

"Can large gas burners successfully compete with the arc light?"

"How can the trouble from naphthaline be alleviated?"

"What is the proper position for gas exhausters?"

"Can the gas engine be successfully used to drive an exhauster?"

"What is the best means for removing tar from the gas?"

"Does a heavy setting of retorts require more coke to maintain the heat than a light setting?"

It is hoped each member will make a decided effort to be present at the meeting, that we may have a large and pleasant gathering.

Parties wishing to join the Association can obtain blanks by applying to the Secretary,

C. J. R. Humphreys,
Box 6, Lawrence, Mass.

## "DR. ROBINSON, OF COLUMBUS, OHIO."

In the news columns of current issue of the Journal we publish an interesting letter, from the pen of Mr. Emerson McMillin, of the Columbus Gas Light Company, formulated in reply to certain ridiculous and extravagant charges made by the members of the local Council Board in regard to the manner in which the gas consumers in that city were being "swindled by the managers of the gas company." Of course, the Council must of necessity be represented by a proper spokesman, and the choice of same appears to have resulted in the selection of one "Dr. Robinson," who, to put it mildly, has been "speaking with a vengeance." But, as is the case with the majority of "mouthing reformers," the "Dr." warming up with his subject, as he proceeded to unfold the matter "in all its harrowing details," so far overstepped the bounds of caution and carefulness that, ere he rightly knew it, he found himself floundering in the mire of a ditch, the excavation and "miring" of which had been but the natural result of his own zealous though misguided labor.

The "Dr." may possibly be a very worthy member of that profession which essays to combat and overthrow the various bodily ills encountered by mankind; and if he be a disciple of Æsculapius we make no doubt that he worthily and creditably carries the "knotty staff round which was entwined a serpent, the symbol of convalescence." Still, while we have no positive evidence that "Robinson, of Columbus," is the possessor of a graduate's diploma, and the proud owner of a "large and growing practice," it is only fair to presume that he may have either or both, since the "Dr." prefix, as well as the "M. D." suffix, rightfully belong (the latter always, and the former usually) only to those who are duly licensed to "prescribe." However, be he "medicine man" or not, the fact remains unaltered that "every cobbler should stick to his last," and in Dr. Robinson's case we would fain remark that the Dr.'s "last" would undoubtedly be but a poor instrument towards a proper "shaping" of the gas supply of his local city—and this also implies that if the "last" could not be adjusted to the Columbus conditions, it would be equally ineffective elsewhere.

About the most remarkable of the absurdities put forth by the "Dr." is his grave assertion that "six-tenths pressure, in all cases, is abundant day or night." Perhaps he meant what he said, and it is only fair to assume that he did; but just there is where he dug down to the maximum depth of his ditch, and added the miry bottom thereto. Supt. McMillin was not slow in seizing the opportunity thus presented, and in his answer to the "Dr.'s arguments" made the following promise in the annexed words, "We will test this on Monday, Sept. 7th, and in doing so will give his claim the best possible show, because Monday is the day of least consumption of the business days in the week. We will, during that day, carry 50 per cent., and at night 100 per cent. more pressure than Dr. Robinson says the consumers ought to have. The pressure will be seven and one-half-tenths in the daytime, and eleven-tenths at night, and will be thus continued as long as consumers will permit." This manifesto from the "sovereign of the gas company" at once placed the redoubtable "Dr." on the anxious seat; indeed it "moved" him to such an extent that he at once visited all the local newspaper sanctums and inveigled the editorial dwellers therein to announce through their columns that "the efforts on date of seventh were to be made for the sole purpose of bringing him into disrepute; that the mains of the Columbus Gas Company were 'too small,' and, therefore, the trial must necessarily result in failure"—and we will add thereto, "failure to support the Dr.'s theory." Despite this pathetic protest the gas men persisted, the promised pressure scale was instituted, and the following was the result:

We regret to commence our tally by noting that Columbus contains "beer gardens;" and many of the proprietors of same illuminate the "gardens" by the aid of arc lights, the dynamos of the establishments being driven by gas engines. The Teutonic owners were at their wit's end, for the engines would not budge—hence the arcs would not hiss; the storekeepers raved; the hotel men fumed; and the cooks were distracted. All of which was brought about because customers could not see what they were buying; the hotel guests could not read their evening newspapers; and the cooks were obliged to give up cooking the evening meal simply because the gas stoves were "on strike." One particular Columbus man rang up the telephone exchange and asked for the gas company, when the operator replied he "could not give everybody in Columbus the Gas Company at one and the same time," and added, on his own account, "it is so dark here anyway that we can hardly see the keys on the switchboard." So it went on all through the night; but the gas men, in spite of pleading and expostulation, kept up the pressure conditions throughout the entire 24 hours, when the "test was adjourned." The "Dr.," however, has not yet surrendered, and proclaims the avowed intention of compelling the gas company to install larger mains, or else he will seek to establish an opposition corporation. Not to mince matters any, we expect the latter object is what the "Dr." has been solicitous about during the whole controversy; and if such is his aim we would suggest that poor success will be his ultimate reward.

## ANNUAL MEETING OF THE IOWA GAS ASSOCIATION.

In accordance with the understanding reached at the meeting for organization of the Iowa Gas Association (held at the Grand Hotel, Cedar Rapids, Iowa, on December 17, 1884), the first annual gathering of the Society took place at the Barret House, Burlington, on date of September 16th. We are rather at a loss to account for the comparatively small attendance that greeted the "call to order" of Chairman Spencer. That such apathy exists in Iowa is not at all creditable to the fraternity of the State, since it should really be a matter of pride with them to see the thing through in thorough good style. President Spencer made every possible attempt to secure success, but was rather heavily handicapped by the fact that Mr. C. M. Williams, of Cedar Rapids, who had been chosen Secretary at the organization meeting, removed to another State, and thus severed his connection with the Association. It is much more pleasing to add that those who were present—probably 50 per cent. of the companies in the State were represented at the late Burlington meeting—were not in the least disheartened; but, on the contrary, pledged themselves to "go on with the good work." And it may be predicted that another twelvemonth will witness a satisfactory endorsement of their efforts. The business transacted was mostly of an informal nature, but nevertheless was pleasing and instructive. Mr. R. Spencer was re-elected President, and Wm. A. Agard, of Des Moines, will occupy the Secretary's desk. In him Mr. Spencer will have an able ally. The next annual meeting will be held at Des Moines, Iowa, on Wednesday, September 15th, 1886.

## THE CINCINNATI MEETING.

We do not here deem it necessary to make any extended notice of the coming annual convention of the American Gas Light Association, in view of the continued reminders of same that have been presented to our readers through the medium of the official pen of Secretary Humphreys. Wide-awake as ever, his thorough ventilation of what is desirable on the part of the members to make the Cincinnati gathering successful in every detail and particular places responsibility for the situation entirely in charge of the proper custodians, and the present outlook augurs well for the success of the assemblage of '85. Let there be no relaxation in the effort to outdo all former records.

## The Market for Gas Securities.

During the fortnight quotations for Consolidated gas advanced rapidly, and it would seem as though a yet greater advance may with safety be predicted. In last market report closing prices were placed at 93¼ to 93½, and at this hour of writing (1 P.M., Sept. 30) we quote the shares as bid for at 97¼. This figure represents the actual market, and every indication is presented that the "bulls" control the situation. We quote Equitable at 128 to 133. Brooklyn shares are fairly steady. The Jersey City (N. J.) situation is a trifle mixed, and friends of the Consumers Company assert that 900 meters have been distributed by that corporation. In out-of-town markets dullness is the prevailing feature, although all sorts of San Francisco (Cal.) gas securities show an advance in values.

## Atkinson's Differential Gas Engine.

According to *Engineering* (to which authority we are indebted for the details given below) the "Inventions Exhibition" is particularly rich in gas engines, all the standard designs as well as several novel forms being shown. Among these none attracts more attention than Atkinson's differential engine, exhibited by the British Gas Engine and Gas Engineering Company, Limited, of Mansfield Road, Gospel Oak, London. This engine not only displays entire novelty of conception, departing from the received practice both of steam and gas engines, but obtains its results, so it is stated, with great economy in the consumption of gas, and by the simplest possible combination of parts. Compression gas engines have hitherto been constructed in such a manner that they compress a certain amount of gas and air, or gas, air, and residuum from a previous explosion, into a cavity in the end of the cylinder, ignite this charge, and obtain work on the crankshaft from the increased pressure due to the higher temperature during the whole of one stroke or half a revolution, during which time the charge is expanded to the original volume. After this the whole contents of the cylinder are allowed to pass into the exhaust pipe at a pressure of 30 lbs. to 40 lbs. above the atmosphere, and at a very high temperature. The well-known "Otto" engine was placed before the public some seven or eight years ago, and other engines followed it, possessing the same features in these respects—that is, expanding the charge to the original volume in half a revolution.

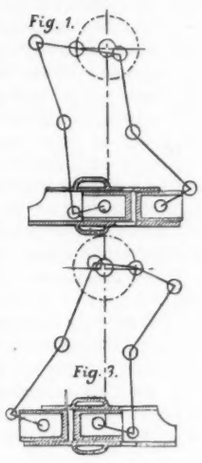


Fig. 1.

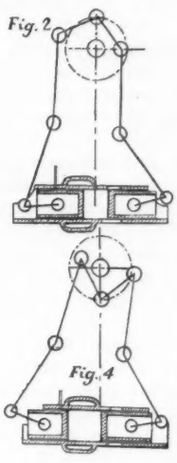


Fig. 2.


Fig. 3.


Fig. 4.

Mr. Atkinson argues that substantially the utmost limit of economy in any engine working in this manner was reached in the "Otto" engine some years ago, and that, unless some other system of working were introduced, no further economy could be attained. The great source of loss in the ordinary gas engine results from the cooling action of the cold water jacket around the cylinder, and to reduce this Mr. Atkinson designed the engine shown in diagram in figs. 1 to 4, and in plan and elevation in figs. 5 and 6, his object being to allow the gases to expand much more rapidly than usual, and thus to be in contact with the cold cylinder walls for a shorter period. Referring to the engravings, it will be seen that the cylinder is open at each end, and is fitted with two pistons. The pistons are connected with double-ended levers and short connecting rods to one crank-pin. The short connecting rods are an essential feature of the design, as it is through their action that the peculiar differential motion of the pistons is obtained. The pistons travel in the same direction, but at very different relative speeds; when at the outer end of their stroke they remain almost at rest for nearly half a revolution of the crank-pin, but travel rapidly when at the inner ends of their strokes. When the two pistons have completed the strokes to the right (fig. 1) they almost touch each other, and have driven out the products of the previous working stroke through a port in the cylinder wall, so that the hot residuum that frequently causes violent premature ignitions is completely expelled. The crank-pin is at this time on the left, and as it proceeds toward the highest position the left-hand piston moves rapidly away from the other, leaving a space between them into which gas and air are drawn in suitable proportions through a self-acting suction valve. At this point (fig. 2) the right-hand piston travels past and closes the openings to the suction and exhaust valves; and during the next quarter revolution the pistons again approach each other, compressing the charge between them to about 60 lbs. pressure, the crank being now on the right-hand side (fig. 3). At the time of greatest compression the left-hand piston passes the opening to an igniting tube (fig. 3), which causes the ignition, and an immediate rapid working stroke is made by the right-hand piston, and is completed by

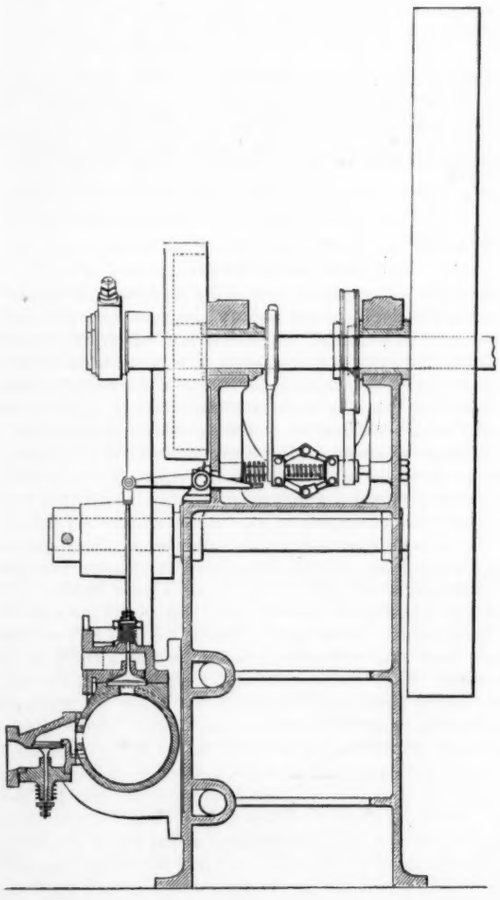
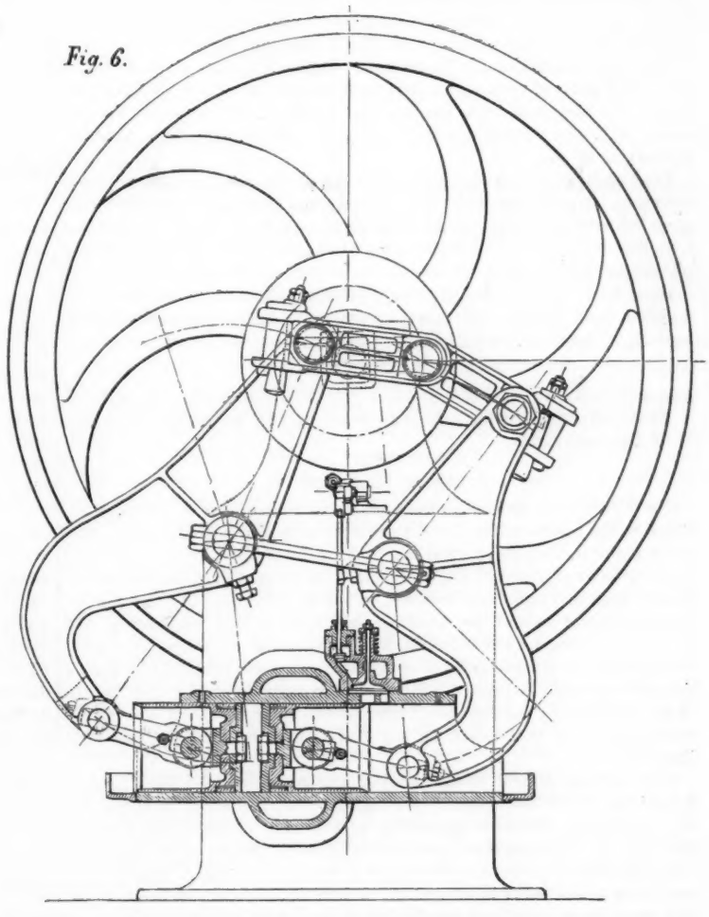


Fig. 6.



the time the crank-pin arrives at the bottom (fig. 4). The exhaust port is now opened by the continued travel of the piston, and the contents of the cylinder are driven out through the self-acting exhaust valve by the left-hand piston, which is now in the position first mentioned, the cycle being completed in one revolution.

The space between the pistons into which the ignited charge expands is nearly double the space into which the charge is drawn; consequently the expansion is continued to nearly twice the original volume, and instead of the exhaust being emitted at 30 lbs. to 40 lbs. it is expanded down to 10 lbs. or 12 lbs. It will be seen also that the total expansion to twice the original volume takes place in one-fourth of a revolution as compared with other engines which expand to the original volume in half a revolution; consequently the expansion to the original volume is done in one-fourth of the time, assuming the engine to run at the usual speed. The economy to be gained from the extra expansion is obvious, while the saving due to rapid motion of the piston was demonstrated in the early part of 1883 by M. Witz, who made some experiments with a view to determining the effect of increased rapidity of expansion. In one series of experiments he used a mixture of one volume of illuminating gas and 6.33 of air—a very usual proportion in gas engines. This mixture was drawn into an experimental cylinder and exploded, the piston being allowed to travel at the rate of 1.7 meters per second, corresponding to an ordinary piston speed in a medium-sized gas engine; and by means of the diagram he estimated the actual amount of work done. He increased the speed of piston, and found that by allowing the piston to travel 4.3 meters per second, or 2.54 times as fast, the same amount of gas did 2.9 times as much actual work. This enormous increase is chiefly due to the fact that the intense heat of combustion is not allowed to continue so long in contact with the walls of the cylinder, cooled by the water jacket. It is well known that more than one-half of the total heat in the gas, even if thoroughly consumed, is lost by transmission to the water. If the work is done in one-fourth of the time, three-fourths of this serious loss must be saved, the transmission of heat through metallic substances being directly proportionate to the length of time the differences of temperature exist; hence the great increase of power shown by M. Witz's experiments.

It is clear that Atkinson's "differential" engine is a great advance from a theoretical point of view, and from a practical one we understand that the British Gas Engine and Gas Engineering Company, of 11 Queen Victoria street, E.C., who manufacture them, are prepared to guarantee a considerable saving in gas.

From an inspection of the illustrations it will be seen that the engine is extremely simple; there is no slide valve—a fact that anyone practically acquainted with the working of gas engines will appreciate—nor is there any complicated substitute, the working fluid being efficiently controlled by the pistons passing the ports to the two self-acting valves, and the port to the igniting tube; in fact it is more simple than any steam engine. There are no joints under pressure, no delicate passages, no cams or eccentrics; and it has only pistons and bearings for the wearing parts.

## Some Notes on the "Novelties" Exhibition Now Being Held at Philadelphia, Under the Auspices of the Franklin Institute of Pennsylvania.

By H. C. Adams.

The "Novelties" Exhibition has been so recently and so frequently mentioned to the readers of the Journal that it now scarcely needs an introduction; suffice it, then, to say that the opening took place at the appointed hour—at noon of Tuesday, September 15. In the course of the address delivered upon that occasion it was said, on behalf of the Institute, that visitors must not expect to find the novelties only those things which they had never seen before, for our industrial world moves with such rapidity at present that what is new to-day is old to-morrow; yet it was believed that among the exhibits would be found the latest improvements in nearly every branch of art, sufficiently numerous and instructive to repay extended and careful observation. In that belief we are glad to say the managers are fully justified.

The exhibition is held in the building erected last year for the Electrical Exhibition, and it covers exactly the same ground, including the Depot Annex, as that did. There is apparently no grouping or classification of the exhibits, which are scattered promiscuously about, thereby really adding to one's entertainment by a continued and wondrous variety. For it would seem that truly "every branch of art" is here represented; all sorts, kinds, and descriptions of exhibits are discovered in a tour of the building, and something to interest each class of visitors is insured.

On account of this very general character of the display there will, of course, be found less of immediate interest to the gas men than there was at the Electrical Exhibition last year; nevertheless there are many things that merit more than casual mention.

The illumination of the building attracts particular attention, considered, as of course it will be, in contrast to the effect produced last year. At that time gas formed a small proportion of the total lights; now we see the conditions happily reversed, and electricity in the background. At least three-fourths of the illumination this year is effected by gas, which is represented so variously as to afford a fine field for comparison. We find the work done by the albo-carbon, the new Lungren, the Siemens, and the Lowe incandescent lights. Besides those there are shown some smaller burners, which are not allotted a particular portion of the building's illumination, but are exhibited in side-booths constructed for the purpose.

The general distribution of the lights is well arranged to afford an opportunity for critical comparison. The electricians are represented by only two systems, both of them are lamps—the McTighe and the Thomson-Houston. To those is allotted the lighting of the main vault, where fifty nominal 2,000-candle power lamps are hung, the annex and the galleries. The gas lamps are grouped adjacently on the main floor. The two main aisles, diverging nearly at right angles from the main entrance, are lighted for half their length with Lungren lamps suspended in rows on each side. The head of the triangular space so inclosed is hung with the high-power Siemens lamps, which extend on out to the main vault. To the west, immediately alongside of the Siemens and Lungren display, come the albo-carbon lights; these extend to the western end of the building and along the western aisle. The Lowe incandescent lights, flanked by a few burners using the carburetted Lowe gas, we find occupying the eastern aisle and the handsome booth that was last year devoted to displaying the effect of the Brush-Swan glow lamps. Along the inclosed gallery at the southeastern end of the building is strung a row of ordinary gas jets.

So it will be seen we have all the important methods of gas illumination spread before us, from the most pretentious to the most humble. The general effect is brilliant and pleasant. We have never seen more strongly marked the contrast between the dead white glare of the electric arcs and the soft, subdued, yet equally powerful light emitted from the gas lamps. Gas is making a showing that will surprise and please the public, who, after all, are inclined to conservatism; and those who had concluded that the gas light "must go" will here find ample evidence that it will make a permanent stay.

In viewing all this one is struck with the absence of the everyday gas jet and the presence of new high-power lamps—some shown here for the first time to the public. A fertile though long uncultivated field is now being worked by inventors, and the result gives an idea of the real capabilities of gas as an illuminant.

We now propose to give a description of the different systems of illumination shown at the Exhibition, and subsequently to mention such other exhibits as may prove of interest to gas engineers.

### The Albo-Carbon Light.

The albo-carbon light is simply a new form of the many methods that have been devised since the beginning of gas making to enrich gas and increase its illuminating power. It is, indeed, in principle very nearly the same as the earliest design to that end. It is an English invention, and has been in use in Great Britain and on the Continent for four or five years. Its introduction to this country was not made until the beginning of the current year, yet so rapidly has it come into use that it is already a familiar sight in the shop windows along our streets. The construction of the appliance is very simple, and we do not see how we could better explain it than by taking one of the albo-carbon cluster chandeliers as an example. There is a pendent pipe for the conduction of the gas, such as we find in ordinary fixtures; at a point on this pipe toward the burner end is attached a hollow, circular, mushroom-shaped regenerating chamber a few inches in diameter, extending out radially and flattening so as to present an extensive lower surface, and so connected to the pipe that, to pass on down to the burner, the gas must circulate through the chamber. At its lower extremity the pipe connects with a hollow, pendent, acorn-shaped chamber of about the same diameter as the regenerating chamber. From this lower chamber there is an outlet up along the outside of the central pipe to a point a few inches below the regenerating chamber, and at that point the burner branches diverge. These branches vary in number in the different lamps, and in the larger lamps the length of each alternate branch is graduated so as to give a series of circles of burners at the different distances from the main stem from which the branches radiate horizontally. The inner circle of burners is thus brought directly under the regenerating chamber. A lever-cock is placed at the top of the central supply pipe to turn the gas on or off; and just below the burners is a valve which regulates the delivery of the gas to the burners (which are Bray's, 2-feet), and by which, when the gas becomes too rich and smokes, a portion of it may be, so to speak, short-circuited, and delivered uncarburetted to the burners, thus adjusting the conditions of combustion.

We can now readily understand the operation of the generator: the gas, entering the central pipe, passes down it to the regenerating chamber, and here, supposing the burners to have been some little time in action, it is highly heated by the subjacent flame. The gas thus acquires a high tem

perature and passes down to the lower chamber, which contains the albo-carbon (Anglice, naphthaline), a solid, white substance which volatilizes at 170°, and which, for convenience of handling, is pressed into small cylinders. The heated gas coming into contact with the albo-carbon vaporizes it, and, taking up a portion, passes up to the burners. Thus we see that it is simply a process for carburetting gas.

In using this process on single burners a special vessel, of a few inches in diameter, containing the albo-carbon, is placed at the delivery point of the fixture. Through that vessel are two passages, one over the albo-carbon, and the other direct to the burner. By turning a key we are able to direct the gas through the carburetter and enrich it, or to send it direct to the burner and use it "straight." The necessary heat to volatilize the albo-carbon is obtained by conduction from a metal plate projecting laterally from the spherical vessel over the flame.

**Albo-Carbon Cluster Light.**

The process is very effective and quite economical. It is estimated that four pounds of albo-carbon will enrich 1,000 feet of gas, and the cost runs from 10 cents to 12 cents per pound. The handling of the carbon is unattended with danger; and if the supply of it gives out, the only effect is a return to the normal candle power of the gas. The cluster lights are made from 3 burners up to 48; the number, of course, being capable of almost indefinite extension. In these clusters it is seen that, to a certain degree, there is a combination of the preheating, or, as it is commonly called, the regenerative system, and carburetting; and it is claimed that by these a light of 8 candles to the foot of ordinary 16-candle power gas is obtained, which is certainly a very good showing.

However that may be, the albo-carbon lights at the Exhibition are a very handsome display. They are shown in clusters of all sizes, and in the larger ones it will be noticed that at a little distance the flames merge and give the effect of a lustrous band of light. The burning is remarkably steady, and the light emitted is clear, strong and white. In fine, this system seems to supply very well the want of a good, cheap method of increasing the amount of illumination to be derived from a given quantity of gas, with the advantage of being applicable on any scale from one burner up to one hundred.

The albo-carbon light is exhibited by its Eastern agents, Messrs. Kitson & Co., of Philadelphia.

### The Siemens Lamps.

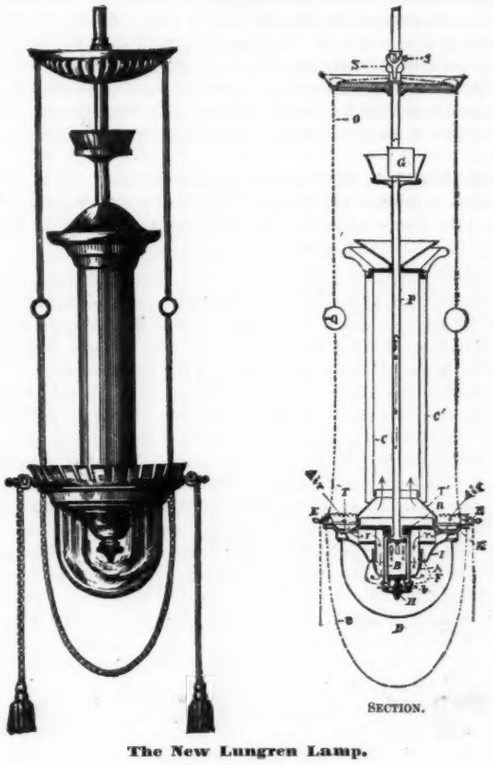
No description of the Exhibition would be complete without a word as to the excellent work done by the Siemens regenerative lamps, which are fully maintaining their reputation, and justifying the commendation they have from time to time received at the hands of the Journal. Occupying, as they do, the very space that Edison and Weston had at the Electrical Exhibition, they are the object of peculiarly trying comparison; but we find as full a flood of light now as when, last year, this spot blazed in the glory of a thousand incandescent lamps.

Nearly all the lamps exhibited by the Siemens Company have 50 feet burners, though some smaller ones are scattered here and there. They are shown in all the various designs, from the plain, work-a-day factory lamp to the highly ornate and burnished fixture designed to hang in some handsome church or public building.

### The New Lungren Lamp.

The objections to the Siemens lamp have been mainly to the relative position and size of the body, the projecting arm of the return flue, and the burner; yet it is doubtful whether the same high efficiency can be otherwise obtained. To approach that standard as nearly as possible, under another form but embodying the same principle, is the aim of the inventor of the Lungren lamp, Mr. C. M. Lungren, of New York city.

This light was brought out in its original form last fall, and since that time it has been undergoing a gradual process of change and perfection, until now, carefully remodeled, it is prepared to take its place among the high-power gas lamps, which it does, publicly, for the first time at this exhibition. The gas is delivered to this lamp either by a pipe passing down through the center of the vertical, cylindrical chimney surmounting the lamp, or by two branch pipes passing down outside the chimney and meeting at its base. From the delivery pipe the gas passes down to a threaded nipple bored across with outlets at right angles, and with its head blocked to the passage of the gas. Upon this nipple screws the base of the burner, which is a hollow cylindrical casting, bored with vertical ducts to carry the gas from the delivery nozzle to the burner proper, which latter consists of two concentric cylindrical shells with an annular gas-way between them passing directly to the tip. This tip is an inverted argand with the orifices in its side. The base of the burner sits about the delivery nozzle, so as to form a small circular chamber, into which the gas enters, and from which it passes down through the ducts of the base to the annular gas-way of the burner, and thence directly to the tip. Besides being pierced with vertical ducts to carry the gas from the delivery pipe to the burners, the cylindrical burner base is cut across with transverse openings from its outside to its hollow center. Around the base is set a wheel-shaped casting, whose spokes, between which are open spaces, serve as a series of air ducts running from the outside of the lamp to the space just without the burner base.



SECTION.

**The New Lungren Lamp.**

Upon the hub of this wheel-shaped air duct is screwed what is called the flame surface, a cup-shaped cylindrical piece, the outside surface of which is covered with a special white enamel, which encircles the burner to the tip, leaving an annular space between. From the outer edge of the lamp there extends down an enameled piece, shaped like the frustrum of a cone, running close to the flame surface and encircling it a few inches above the tip. The object of that is to confine the flame to the flame surface and to draw it up symmetrically. Between the flame surface and this outer shell is the passage for the products of combustion, which rise and pass through the interstices of the air ducts before mentioned, whence they are delivered to the chimney. Just below the burner tip there is suspended, from supports within the burner's hollow center, a circular button, the function of which is to deflect the air coming down the center of the burner upon the outside of the flame, and to cause it to flow up along the flame surface. Around the bottom of the whole lamp is suspended a clear glass, bell-shaped globe, with a lip setting into a flange, and hung with balance weights so as to permit of its being readily lowered for the purpose of lighting, cleaning, etc.

The operation of the lamp, which is on the regenerative system, is as follows: The gas enters the delivery chamber and flows down through the base and the burner to the tip, where it is consumed, the products of combustion passing from the flame surface, where the flame burns, up through the openings between the air ducts. By that means the air entering through the ducts is very highly heated, and passing on it enters the space about the base of the burner. Here some of it passes down in the annular space between the inner side of the flame surface and the outside of the burner; the rest enters through the transverse opening in the burner's base, and passes down through the cylindrical space in the center of the burner, and descending to the tip, is deflected upon the flame by the button suspended beneath. Another supply of air enters within the globe near its top, serving to cool it and to furnish an additional quantity to the outside of the flame.

The preheated air contributes in itself to the completeness of combustion, and in its passage to the tip it surrounds and heats the gas ducts and the gas contained therein, making a further addition to the efficiency. The effect is to produce the complete combustion so essential for the proper con-

sumption of gas as an illuminant. The light emitted is of about the same color as that seen in the Siemens lamp. The flame lies up along the flame surface, forming the inverted frustrum of a cone of light, and burns with admirable effect. The steadiness of the light, so far as it is dependent on outside influence, is insured through its being entirely enclosed within the globe and so protected from all draughts. But the most important feature lies in the light being emitted from the bottom of the lamp, with no body or fixture intervening between source of light and the space to be lighted—a rare advantage.

The lamp is relatively small and compact in structure, and low in cost. In shape it is a small vertical cylinder, with a semi-spherical head, formed by the globe, at the lower end. The lamps at the Exhibition burn 16 feet; but soon others will be ready burning 8, 12, 25, and 35 feet. The newness of this lamp, and its clear, strong light, attract considerable attention, greeting the visitors immediately on their entrance, and presenting an effect that is indeed novel and almost incredible to the majority of gas consumers who observe it.

The exhibit is made by the Siemens-Lungren Company, of Philadelphia, a consolidation of the Siemens Regenerative Gas Lamp Company, of Philadelphia, and the Lungren Gas Appliance Company, of New York city.

### The Wasserman Lamp.

We now come to what is called the "newest regenerative gas light." It probably merits that appellation, for it has just emerged from the embryonic state. It takes no part in the general system of the illumination of the Exhibition, but is exhibited by its inventor, Mr. Adolph Wasserman, of Philadelphia, in a small space to the north of the Lowe exhibit.

In construction the lamp is novel and interesting. It can be placed on any ordinary bracket without change of fixture. From the point where it attaches to the delivery pipe there rises vertically through the center of the lamp a piece of pipe five or six inches in length. That pipe is surrounded by an inverted hollow cone of metal, covered with a porcelain shell, whose base lies a few inches above the top of the pipe, and whose apex—the lowest point in this case—fits into a cylindrical chamber about the bottom. From that chamber four hollow, metallic arms diverge at right angles to each other and extend a few inches horizontally. At about half way along their length are fixed four vertical tubes, one on each arm. These tubes fasten to a circular flange at their top, which supports on its inner edge a cylindrical sheet of metal about an inch high. The flange is about one-quarter of an inch wide, and on its outer edge screws a second cylindrical shell concentric with the one just above mentioned, forming an annular chamber, at the center of which, projecting from the outer shell, is a flange to act as a check on the flow of gas. On the top of this annular chamber sits the burner, a ring of block brass, with a circle of 24 tube like orifices cut solidly out of it. The orifices are about one-sixteenth of an inch in diameter, and about one-sixteenth of an inch apart; they communicate directly with the gas chamber beneath them.

Around the burner and the gas chamber is a sheet brass jacket, resting on the four projecting arms, and at its top slightly drawn in towards the burner tubes. Extending laterally from the outside of the jacket is a circle of sheet metal, closely perforated with holes, to regulate the flow of air. At the edge of this perforated sheet is the chimney, a cylinder of clear glass, with its base resting on the extremities of the four projecting arms, and its top a few inches above the base of the inverted cone.

The operation of the lamp has probably already been discovered from the description of its structure. The gas enters through the central vertical pipe and ascends to its top, where it is delivered in the space within the base of the hollow cone. The cone has, of course, become heated by the action of the flame beneath it, and imparts its heat to the contained gas, which passes on down to the cylindrical chamber at the apex of the cone, where the four arms branch off. Entering these arms the gas flows through them, ascends the four vertical tubes, is delivered into the gas chamber, and then passes directly to the tip. It is a peculiar feature of the construction that these four vertical delivery tubes are of the same diameter as the 24 orifices they are intended to supply. The air, flowing to the burner, enters the open bottom of the lamp, passes between the four horizontal arms, and ascends through the central cylindrical space encircled by the gas chamber; it also passes up outside of the gas chamber, between it and the jacket. A further supply of air is delivered upwards outside the jacket, through the holes in the sheet between it and the chimney. The air that enters the inner part of the lamp strikes the outside of the metal flues that are heated by the hot gas flowing through them from the cone, and thus has its temperature raised before it reaches the point of combustion. As that preheating is accomplished with both air and gas, we have the essentials of what is called the regenerative system of gas lighting.

In appearance these lamps look exactly like large Argand burners with inverted white cones placed in the middle of the chimneys. The flame burns up along the under surface of the cone, making a band of light about two inches high. The only lamps made as yet burn ten feet; in tests made with them they have given about five candles to the foot of our 16-candle gas. That is not very high efficiency; but the lamp is in a crude state, and may be much perfected in the future. It is another step in a good direction towards small regenerative lamps.

In the question of superiority of methods we incline to these regenerative lamps. The first consideration in consuming gas is to get as much as possible out of the gas *per se*, without resorting to outside enrichers. And any process that obtains from a given quantity of material a larger or better derivative product than was formerly obtained from the same material, is a true advance in industrial art, and this the regenerative system represents.

In the next issue of the Journal we propose to describe the Lowe plant and light, and the remaining exhibits of especial interest.

## Mr. Emerson McMillin in Reply to the Charges Made against the Columbus (Ohio) Gas Company.

[In our item columns of last issue mention was made of the fact that certain members of the Columbus City Council were engaged in the now rather common councilmanic practice of attempting to stir up public sentiment in that city against the present management of the Columbus Gas Company. We also then promised to republish Mr. McMillin's "open letter" in answer to the "charges" advanced, and we herewith redeem that promise. The letter appeared originally in the Columbus *Sunday News*, date of September 6th. To make matters clear to our readers, we add that Dr. Robinson and other members of Council asserted that the pressure could not be reduced by turning off the meter cock. They said the supply could be reduced, but the pressure not.]

As briefly as possible I reply to some of the attacks made on the Gas Company in the Council and through the city press. I published a letter in the *Times*, Aug. 8th, in which I tried to show the shallowness of the attacks made, and also suggesting the probable motive. In this letter it was shown that Dr. Robinson had made misrepresentations respecting the cost of lighting the City Hall building, he having asserted that it was costing over $200 per month. My figures showed that it had cost during the then past twelve months $116.72 per month; and that instead of its costing between $2,000 and $3,000 per annum, it had cost the last twelve months $1.400.61, and that after the removal of the post office it was costing at the rate of less than $1,000 per year. The doctor, in his reply, goes back six years, when gas was selling for nearly double the price prevailing the last two years. Had he gone back only five years, when gas was selling 52 per cent. higher than now, he would have convicted himself of misrepresentation as to annual cost as he did respecting cost per month.

In an interview with a reporter of one of the city papers the doctor claims to have established every issue raised against the gas company, and that he has not been controverted on a single point. Just how many "points" the doctor has raised against the gas company, or had raised at that time, I do not know, but only two have been noticed by the press. The first one is respecting cost of gas at City Hall, and in this his own figures, and the time, far back in the past, to which he had to go to get even as good showing as he did, "controverts" him without a word from the gas company. His second point was his great "discovery" of the valuable secret withheld from consumers by the company, that to obtain the most light for the least money gas should be consumed at low pressure. He seems to have abandoned the *role* of "discoverer," and now admits that the representative of the gas company told the same thing to the public some months before he did. This established principle being much older than either the doctor or the writer, neither of us can lay claim to its discovery.

We are charged with carrying heavy pressure in our pipes to the consumer, where it is to our interest to make the consumption heavy, and of using governor burners on lamp posts where it is to our interest to make the consumption light. I have before said, and I say it again, that it is not to the interest of any gas company that consumers' gas bills should be large. On the contrary, the most money is made by pursuing a policy exactly the opposite, so far as the gas company is able to control the matter. Aside, however, from any such claim on our part, what is to prevent the consumer from employing exactly the same methods employed by the gas company in preventing an undue pressure of gas at the tips of their burners? We have no patents and do not control the sale of gas burners. The gas that is used in the telephone boxes probably does not cost the gas company quite as much as gas costs the consumer, and the company is quite as well able to stand a little carelessness as is the average consumer; yet the company considers the matter of enough importance to put on a burner that will give the most light at the least expense to the company. While the pressure for an ordinary two-story house may be satisfactorily adjusted by turning off the meter cock (and in this way exactly the same results are obtained as would be by reducing pressure at the works), yet it is not so perfect a mode as is the use of a governor burner, or, in case of large business blocks, a separate governor for each floor. While upon this question of turning off or reducing the

pressure at the meter during the time gas burners are lighted, I must notice some things that were reported as having been said at the last Council meeting, in which an amount of ignorance was displayed such as one would expect to hear from a gas expert's attempt to discuss dentistry or law. Dr. Robinson says the meter cock is put there to be used in case of fire. That will doubtless be news to the consumer, as it certainly is to the gas company. Think of a person running through to the back end of a burning building to reach the opening to the cellar, then forward in a dark cellar, full of boxes and barrels, to the front of the building where the meter is usually placed, and then have to retreat by the same route! How many meters would be turned off under such circumstances? No, sir; the meter cock is put in for a twofold purpose. First, the consumer may turn off the supply if he thinks he can detect the smell of escaping gas; and, second, that the pressure may be adjusted to suit his wants. If he is on high ground, or close to the gas works, or on a main where there is a limited consumption, his pressure will be too high, and will need to be reduced by turning off the meter cock, unless he uses governors. It has been asserted that not one hundred of the consumers in this city know that there is any way by which they can turn off the gas at their meters. That is an insult to the intelligence of our consumers.

Dr. Robinson, illustrating the impossibility of regulating the pressure by the meter cock, said that, "to adjust the light in the Council Chamber, and then light the same number of burners in the hall above, some of the lights below will be shut out." True, if the lights below had been adjusted to an extremely low pressure, and in any event the light would be reduced. Why? The gas, being less than half as heavy as air, ascends, the pressure increasing about a tenth for every ten feet of elevation. But that any person with average intelligence should contend that exactly the same thing would not occur had the pressure been reduced at the works, instead of being reduced at the meter cock, is beyond my comprehension. Reason and argument can avail nothing here. Dr. Robinson says the gas company has been telling its consumers for 25 years that they can reduce their pressure by turning off the cock at the meter. Well, should he live long enough, and the company continues to do its duty to its patrons, he will hear the same story 25 years hence. Dr. Halderman said that "so long as the aperture of the feeder at the works is no larger than the sum of all the apertures leading to the meters, the pressure would be exactly the same all over the city." The doctor is an intelligent man, and one who would not purposely mislead, and I do not doubt but what he will correct his statement when he gives the question more consideration. If his statement was true, then as much gas would pass out of the aggregated little apertures at the ends of the long lines of pipe as would pass out of the one large aperture at the works, if disconnected from the long lines of pipe. I will give you one instance to illustrate the fallacy of his assertion. A one-inch pipe, 30 feet in length, under ten-tenths pressure, will discharge in one hour 675 feet of gas; while through 300 feet in length it will discharge but 213 feet of gas, the initial pressure remaining the same in each instance. Why? The greater friction in the longer line of pipe reduces the pressure, and consequently the quantity of gas. This one illustration shows the impossibility of the gas company adjusting the pressure to each consumer's requirements.

It was charged that "Huntington and McMillin had agreed to meet the committee on a certain night, and to reduce the pressure to sixteen-tenths. They failed to meet the committee, and instead of reducing the pressure, increased it." In reply: Neither Huntington nor McMillin ever promised to reduce the pressure to 16-tenths, and Huntington did meet the committee. Whether the charge that we increased the pressure for the purpose of misleading the committee, or for any other purpose, is true, will appear further along. There is manifestly a disposition to mislead the public respecting the quantity of gas that will pass through a burner at different pressures. Dr. Robinson is reported to have shown that a six-feet burner will, with 19-tenths pressure, consume 18 feet per hour. He ought to copyright that "discovery." There can be no doubt about its paternity. A six-feet burner is one that will consume six feet of gas per hour under 10-tenths pressure, and will burn at 19-tenths pressure a little over 8.75 feet, instead of 18 feet. But to be fair, the doctor started off on the basis of 6-tenths, instead of 10-tenths, at which pressure burners are rated. If this burner consumed six feet at six-tenths, it would consume less than 12 feet at 19-tenths. We will not speculate about things of which the public know little, but instead will give the results of actual tests made with the best of apparatus. With five-tenths pressure a burner consumed six feet per hour; at four-tenths, 5.22 feet per hour; at three-tenths, 4.56 feet per hour; being a decrease of 40 per cent. in pressure, and 24 per cent. in gas. Another series of tests, made with a different class of burners, gave the following results: At five-tenths pressure 4.5 feet; at 9.5-tenths, 6.75 feet; and at 19-tenths, 10.2 feet per hour were consumed. There is a general rule that "doubling the pressure increases the flow one-half." This is not mathematically correct, but near enough for practical use. The doctor, however, has discovered that the increase is double that quantity. It is plain that Dr. Robinson either does not understand the insignificance of the loss in burning gas at 8 or 10-tenths pressure over that of burning at the most economical point, say, at 5 or 6-tenths, or otherwise purposely tries to mislead. The light is increased almost with the increased consumption from five up to ten-tenths. I assert that there are not twenty gas consumers in this city who will burn gas at less than ten-tenths in an open burner if they can get that pressure. To reduce to the most economical point is to sacrifice comfort and to blacken ceilings. It is no compliment to the intelligence of the gas consumers living along the lines of high pressure to assume that they burn their gas at the full pressure of the mains. They do not do it. If when they light their gas it blows, they turn it down until it ceases to blow and shows a good steady light. I venture the prediction that not 50 per cent. of the gas sent out is consumed with a pressure at the burner orifice exceeding ten-tenths, and that not 10 per cent. is consumed at a pressure exceeding 12-tenths. Yet we are told by the wise men of the Council that if the gas company would reduce the pressure to the proper point, one-half less gas would be consumed, and *hundreds of thousands of dollars would annually be saved* to the consumers. As the total sales fall far short of the minimum sum named, it is difficult to see just how this saving is to be figured out. If, as the doctor tells the public, there is 6-tenths difference in the pressure at the various points in the city, how are we to regulate the pressure at the works so that it will not still be necessary for the consumer to regulate his own pressure, either by the meter cock or by the governors? I have already referred to the loss of pressure in gas flowing through pipes caused by friction. How can the company give Hessenauer's Garden or the North End a good supply of gas without giving the business houses about the corner of High and Long streets too much pressure? And if these business houses must, to get the best results, turn off the pressure at the meter, is it a greater hardship to turn the meter cock one-half off than to turn it one-third off?

So long as the press and members of Council accept the statements of Dr. Robinson as facts, they are certainly justified in becoming a little excited, and that the former should praise the doctor's sagacity and energy, and that the latter should suggest summary measures for eradicating the evil, should be expected. I now assert, and will undertake to prove to the satisfaction of any impartial committee, that every principal statement that has been made by Dr. Robinson, in this controversy, is grossly false. His charges that the gas in the city building was costing over $200 per month, and between $2,000 and $3,000 per annum, were false. It was not, at the time the charges were made, costing the half of the sums named. His charges that the company had reduced the pressure since he opened his batteries, and that the result is a reduction in the bills of 25 or 30 per cent., is false. His charge that doubling the pressure, doubles the quantity of gas consumed, is false. His statement that any increase in the quantity of gas that passes through a burner at over five or six-tenths pressure is wasted and gives no light, is false, as also is his assertion that gas, at above five-tenths pressure, escapes unconsumed and vitiates the atmosphere. Gas is much more perfectly consumed at a pressure of 20-tenths than at 5 or 10-tenths. He does not know the fact that the more rapid and perfect the combustion is, within certain limits, the less is the light obtained. His statement that the gas company admits or says that it cannot give good light at a less pressure than it now gives, is false. His claim that the gas company has *refused* to reduce the pressure is false in this, that neither the City Council, the Gas Committee, nor any consumer, save only Robinson himself, have ever asked the company to reduce the pressure, and he asked to have it reduced only from 22 to 20-tenths. His charge that the gas company's mains are too small, is disproven by his own assertions that the pressure everywhere in the city is double or treble what it ought to be. His statement that McMillin said in the Board of Trade lecture that the burners in the Board of Trade room were then consuming 25 per cent. more gas than was necessary to give good light, and *assigned the small mains* of the company as the reason, is false. His pretending to read to the City Council an extract from a paper by Dr. E. G. Love, Gas Inspector of New York, was in keeping with his other deceptions. The copy of the *Sanitary Engineer*, from which he read, contained nothing of the kind from Dr. Love. The saving of gas at the City Hall, by reason of reduced pressure, has been the doctor's principal card. His saving here is the proof positive of the virtue of reduced pressure. Every day or two for some time it was announced that the pressure has been reduced four or six-tenths; latterly the claim is that the pressure has been increased. This is doubtless thought to be necessary to account for the probable increase in the September bill. Before discussing the pressure feature of this claim, for which the doctor has received so much credit, let us see if we cannot ignore that feature and still account for the small bill. First, in order to prove his assertions, the doctor would doubtless see that no unnecessary burners were lighted during the month. Second, there was, I believe, but one Council meeting held in the chamber, instead of five, as would have been the case had a meeting been held on each Monday night as is the custom. There was no meeting of the Board of Trade Asso-

ciation; but, above all, there was no post office there as in former years. In the *Dispatch*, of Aug. 29th, in figuring out this wonderful saving, there is $7.94 put in as the sum that would probably have been added had the post office still been in the building. The post office may have paid only $500 a year, as asserted, for their gas; but this would be over $40 per month, instead of $7.94. A much larger per cent., however, of August bills are chargeable to the post office than would be chargeable in January. That office burned gas all night, winter and summer, while other offices in the same building would seldom light their gas in summer, but would be large consumers in winter. Did the post office burn only $500 worth of gas? Who can tell? It was not measured to them, but was measured with the gas that was used in all other parts of the building. The only indication or fact that we have to judge from is the quantity they consumed in their new quarters. Did they burn there at the rate of $7.94, or even at the rate of $40 per month? They burned gas at the rate of about $1,000 per year. This alone is enough to account for all the difference in the gas bill, without taking into account the efficacy of the four or six-tenths reduction in pressure. Some may still insist that a portion of the saving must be due to the reduced pressure brought about by the doctor's war on the gas company. In answering these I append a few affidavits:

E. McMillin, Supt.:—

In answer to your inquiry, I say the pressure on the gas mains in this city has not been changed since late in February, at which time the present automatic governor was attached. This governor, as you know, puts on the pressure only as required by consumers, being limited to a maximum of 23-tenths, and a minimum of 13-tenths. The maximum, as used during the heaviest hours of lighting, is about 22-tenths, and it stands at about 14-tenths during the daytime. On Sunday nights the pressure is about 19-tenths. The governor has not been modified, reduced, increased or changed in any manner since it was first adjusted, and there has not been either an increased or decreased pressure since the appointment of the special committee of the Council to investigate this question, as is reported to be charged in said committee's report.

[Signed.] William Enfield,

[SEAL.] Sworn to before me, and by him subscribed in my presence, this 4th day of September, A. D., 1885. E. L. Robinson,
Notary Public, Franklin County, Ohio.

I have read the above affidavit of Mr. Enfield, and say to my own knowledge it is true so far as it refers to the pressure in the mains during the hours between six in the evening and six in the morning. I am not at the works during day hours. Edward Dundon.

[SEAL.] Sworn to before me, and by him subscribed in my presence, this 4th day of September, A. D., 1885. E. L. Robinson,
Notary Public, Franklin County, Ohio.

William Enfield and Edward Dundón are my assistants in the management of the gas works. They have in charge the automatic governor that regulates the pressure of gas in street mains, and no other person or persons are permitted to touch it or make any changes in the pressure. And they will make no changes to increase or decrease the pressure without being instructed to do so. Neither myself nor any other officer of the gas company have given instructions to change the pressure, and I am sure that no change has been made. I further state that Dr. Robinson, member of the Columbus City Council, had been assured by me that no change had been made, and as additional proof, was shown our pressure register sheets, on which are recorded the pressure every minute of the 24 hours of each day, and every day of the year. Dr. Robinson was in possession of these facts at the time he made his report to the City Council, in which report he is reported by the press of this city as asserting the contrary. E. McMillin.

[SEAL] Sworn to before me, and by him subscribed in my presence, this 4th day of September, A. D., 1885. E. L. Robinson,
Notary Public, Franklin County, Ohio.

The hardest imaginable things have been said of the gas company here because it has thought it necessary, in order to accommodate patrons, to carry a pressure in its street mains during the day of 13 to 14-tenths, and during the heavy lighting hours of 20 to 22-tenths. One would suppose, to read the discussions in the Council, that ours was the most corrupt gas company in the world. To disabuse the public mind of that idea, I append a list of cities selected indiscriminately from all parts of the country, and give the pressure carried in the mains of those cities:

| Name of City. | Day Pressure. | Night Pressure. |
|---|---|---|
| Columbus | 14-tenths. | 22-tenths. |
| St. Louis | 18 " | 25 " |
| Detroit | 18 " | 30 " |
| Cincinnati | 18 " | 30 " |
| Indianapolis | 18-tenths. | 28-tenths. |
| Pittsburgh | 15 " | 24 " |
| Chicago | 12 " | 17 " |
| Nashville | 13 " | 25 " |
| Springfield (Ill.) | 18 " | 30 " |
| Cleveland | 10 " | 12 " |
| Washington (D. C.) | 10 " | 10 " |
| Dayton | 12 " | 26 " |
| Wheeling (summer) | 16 " | 25 " |
| " (winter) | 20 " | 28 " |
| New York | 14 " | 30 " |
| Philadelphia | 18 " | 30 " |
| Newport (R. I.) | 12 " | 23 " |
| Atlanta | 15 " | 40 " |
| Milwaukee | 12 " | 22 " |
| Ann Arbor | 18 " | 30 " |
| Boston | 18 " | 27 " |
| Covington (Ky.) | 14 " | 28 " |
| Birmingham (Conn.) | 12 " | 28 " |
| Brooklyn | 8 " | 21 " |
| Lynn (Mass.) | 10 " | 25 " |
| Minneapolis | 15 " | 20 " |
| Des Moines | 15 " | 25 " |
| Hartford (Conn.) | 25 " | 35 " |
| Richmond (Va.) | 15 " | 20 " |
| New Orleans | 20 " | 24 " |
| Syracuse (N. Y.) | 18 " | 24 " |

A few of these places are required by contract to furnish *not less* than a specified pressure; but none are prevented from giving as much more as they shall find necessary to accommodate the consumers. Detroit is required to furnish 20-tenths; Cleveland is required to furnish 12-tenths in the heart of the city; Washington is required to furnish 10-tenths at the Inspector's office, which is the lowest point in the city, and which probably gives 12 to 15-tenths during lighting hours to their consumers; New York keeps 18-tenths at the street lamp burners; Brooklyn is required to keep 10-tenths at burner. The citizens of those cities, it is safe to say, possess as much intelligence as is contained in the gas committee of Columbus.

The pressures are those carried at the several works, except in the instances of Chicago, Cleveland, Washington, Brooklyn and Boston. These are the pressures in the heart of the cities, except Washington, which, as before stated, is at the Inspector's office. You will observe that in the list Philadelphia, Richmond and Wheeling are given. These cities own their gas works, and can control the pressure as they choose, and certainly would not rob their own citizens. By reason of the elevations in the cities of Richmond and Wheeling, above the gas works, 20-tenths there would give as much pressure to the consumer as 25-tenths would in Columbus. The average pressure of the three cities is 17-tenths in the daytime, and 24-tenths at night, 21 per cent. greater in the daytime, and 9 per cent. greater at night than the pressure in this city. The average of the 29 cities (excluding Columbus), is 15.3 for the daytime, and 25.2 for night pressure, which is nearly 9 per cent. greater in daytime, and 12.7 per cent. greater pressure at night than is carried in Columbus. There is perhaps no city in the world better served with gas than is the city of London, England. The most eminent scientists of the age compose the board of referees. Under the acts of Parliament they may assess fines on the gas companies for letting their pressure run too low, but it remained for the Gas Committee of the city of Columbus to "discover" that this English Board has been laboring under a delusion, and that punishment should be inflicted for putting on *too much* instead of putting on *too little* pressure.

The paper from which the *Sanitary Engineer* published an extract, a portion of which Dr. Robinson read to the Council as the production of Dr. Love, was read before the North British Association of Gas Managers, and if space would permit the whole paper would be given to the public. It would answer the clamor of Robinson, Briggs and company much better than I can. That paper was prepared and read by an eminent English engineer, and he took the ground that gas companies ought to control the pressure of gas by attaching governors near each meter—that the attempt to control the pressure in the mains had in the past proved, and must from the necessity in the case in the future, prove futile; that a maximum pressure must be carried to supply consumers in overtaxed districts, and consumers with small pipes, and then regulate each consumer's pressure, as before stated, at the consumer's meter.

One gentleman in the Council asserted that instead of purifying its gas with lime the gas company purified with sand and sawdust, and by that assertion he furnished a gauge of his knowledge on the subject under discussion, and about which he was trying to enlighten the other and less erudite members. A visit to the works by any intelligent person, who can tell oxide of iron from sand and sawdust, will disprove his assertion.

The Columbus Gas Company is furnishing gas of a quality 10 to 25 per cent. above the contract price. The gas is of unusual purity. It is furnished 25 to 50 per cent. cheaper than gas is furnished to other cities similarly located. The company has offered to light the streets for about half the price that is being charged elsewhere, and yet the company is abused and villified, and the most strenuous efforts are made by a few members of the Council to totally destroy the value of its property.

After trying to show that the company has been doing what its officers believed right, and what our consumers have a right to demand of us, we are willing to let the consumers themselves judge between our acts and what the committee say ought to be done. Dr. Robinson says 5 to 6-tenths pressure is abundant, day or night. We will test this on Monday, September 7th, and in doing so we will give his claim the best possible show, because Monday is the day of least consumption of the business days in the week. We will, during the day, carry 50 per cent., and at night 100 per cent. more pressure than Dr. Robinson says the consumers ought to have. The pressure will be seven and one-half-tenths in the daytime, and 11-tenths at night, and will be thus continued as long as consumers will permit. E. McMillin.

## SPECIAL ENGLISH CORRESPONDENCE.

Communicated By Norton H. Humphrys.

Salisbury, Sept. 10, 1885.

*The Present Depression and Future Prospects of Sulphate of Ammonia.—The Financial Position of Gas Undertakings.—Advantage of Enterprise.—Price of Gas.—The Lancaster Corporation Gas Works.*

The principal event of the past month is the reading of a paper by Mr. Bradbury (of the well-known firm of Messrs. Bradbury & Hirsch, of Liverpool), at a meeting of the Manchester District Association of Gas Engineers, on the subject which forms the first item in the above syllabus. Coming at a time when attention is directed to the question of residuals—not only by the fall in the price of sulphate but also by the more important fall in the price of tar—the utterances of so well known an authority will carry great weight. To show how serious this matter is, it may be mentioned that two or three years since the market value of tar was $10 or more per ton, while now it is less than $3—about one-fourth of its former value; and sulphate, which at the former period realized $100 or $105 per ton, now stands at less than $60. Gas companies look to the tar and liquor to return one-third or so of the cost of their coal, so this fall in prices is equivalent to an increase of about 25 per cent. in the cost of the coal, or to an addition of 6 or 8 cents to the working expenses for each 1,000 cubic feet of gas. Engineers who have been sailing close to the wind, by selling gas at the lowest price that admitted of earning the dividends, will be seriously embarrassed; for the shareholders will not be willing to accept a smaller percentage of profit, nor will the consumers be inclined to pay more for their gas.

Mr. Bradbury remarks that, prior to 1882, sulphate was regarded as the standard manure for the beet fields of Europe. Peruvian guano, the only other large source of ammonia, had been deteriorating for years; nitrate of soda, the only other possible opponent to sulphate, had fallen into disrepute. Hence the high range of values prevailing during the years 1875 to 1882. The prices of sulphate, however, caused German chemists to turn their attention to the possibility of utilizing the then much cheaper nitrate; and the outcome of their experiments was the discovery of methods whereby it could be applied in such a manner as to give results equal to sulphate. Meantime, in England, the high prices attainable for sulphate had attracted attention, and all sorts of schemes were proposed for increasing its production. Ammonia was to be recovered from coke ovens, blast furnaces—even colliery owners were to distill small coal for the sake of the product, and attempts were not wanting to utilize the nitrogen of the atmosphere as a source of ammonia. The same mistake was made that happens in prosperous times in other trades—the standard of one or two good years being taken as the basis of future operations. So there was the increased use of nitrate, and the threatened over-production of sulphate, operating simultaneously against the value; and in addition to these speculators came in, and by "bear" speculations made matters much worse for the manufacturers.

So the causes for the present low value of sulphate are summed up as the larger consumption and decline in value of nitrate, increased production, impoverished condition of agriculturists, and "bear" speculations. As regards the future, Mr. Bradbury thinks that although the cheaper production of nitrate will prevent anything like a return to old prices, still sulphate must recover the abnormal reduction in price that has been forced by the speculators. In this respect it will be assisted by the fact that the nitrate producers, in the hope of forcing a rise in price, have agreed to limit the production of nitrate. Sulphate possesses certain advantages as compared with nitrate, and the home consumption is increasing. Mr. Bradbury advises sulphate producers to stimulate consumption by every possible means, by developing home trade, and by encouraging research as to the best means of applying it. In this latter respect the example of the nitrate producers, who have offered £1,000 as prizes for essays on the use of nitrate as a manure, and subscribed 500 tons to be used for experimental purposes, may be followed.

Obviously the nearest work in the way of promoting a better market for sulphate consists in the development of a local trade. To this subject I have referred in previous letters, and there appears no reason why small gas undertakings should not be able to dispose of the whole of their production in their own immediate neighborhood, thus avoiding the cost of transit and the plundering of speculators. Very opportunely my friend Mr. King, of the *Journal of Gas Lighting*, has recently published a series of leaflets in a cheap form, suitable for distribution among possible users of sulphate, setting forth the proper method of using, its advantages as compared with nitrate and other manures, etc. Gas companies cannot help the competition of nitrate, or over-production; but by cultivating direct contact with the users they may avoid the additional loss which is shown clearly by the above paper to have resulted from the operations of speculators.

The effect of the fall in the price of tar, however, has not yet made itself evident in the revenue records of gas companies, who usually sell by contract covering a year or more in advance. Indeed, this practice is pressing heavily upon tar distillers, and some have been ruined. So that, so far as may be judged from the accounts for the first half of the year, gas undertakings are in a satisfactory condition, and are able to pay good dividends. Against the loss on the tar and liquor may be placed the increased revenue derived from coke, due to the fact that, by introducing generator furnaces, some economy has been effected in the fuel accounts, leaving a larger proportion of coke for sale; and probably in a greater measure to the increased demand for smokeless fuel, and appreciation of the value of gas coke. Many undertakings, by introducing breaking machinery to reduce the coke to the required size, and by better arrangements for delivery to customers, etc., have considerably increased their coke trade within the last few years. The usual increase in the quantity of gas consumed has also been experienced, and slightly lower prices have ruled in the coal market. So that, on the whole, although there is a "fly in the ointment," the gas industry is in a very satisfactory condition, and will be able to maintain this position, notwithstanding the decreased receipts for tar which will figure in the accounts for the current half year.

It is to be regretted that, with the diminution of the electric lighting craze, gas companies generally are showing a disposition to fall back from that state of enterprise in respect to the better lighting of thoroughfares and the introduction of large burners, into which they were temporarily roused by their brilliant but evanescent would-be competitor. An old proverb sets forth that "possession is nine points of the law;" and if by a wise liberality they advertize the undoubted capabilities of gas for effectively lighting large areas, they will attain a position more secure and tenable than any to which they could hope to reach under the obvious stimulus of competition. There certainly exists a demand for lights of a power scarcely thought of before the present decade; and with a little encouragement to invention in the direction of large burners, before many years pass away there will be a large number of gas lights in use, not of a consumption of 5 cubic feet per hour as at present, but ranging up to 50 cubic feet or more per hour. The introduction of recuperative and other kinds of large burners shows that the tendency will be to replace clusters of ordinary burners, such as sunlights and gasaliers, with one large burner. In this season of comparative calm the managers of gas undertakings will do well to extend their borders in every possible direction—lighting, cooking, heating, and motive power—and thus render their position as secure as possible against that competition which, in this restless age of science, is sure to be brought against them from time to time.

One large gas undertaking, belonging to an incorporated company, has announced an increase in the price of their gas, from the 1st of October next, on account of the fall in price of tar and liquor. The present price is 78 cents per 1,000 cubic feet, and it is to be raised to 86 cents. A discount of 12 cents from this figure is allowed if the account is paid within a stipulated time; so at the increased price the consumers will have an opportunity of obtaining their gas for 74 cents, which is certainly not a very exorbitant amount. While upon the price of gas, I may refer to my remarks last month with respect to the gas supply at Manchester and Salford. Rather warm discussions have taken place, particularly in connection with the former city, and the result is that in both cases the old practice is to be continued. At Manchester it appears that there are 90,000 ratepayers and only 52,000 gas consumers; and this shows that the ratepayer and the gas consumer should not be treated as one and the same person. But it appears that the Manchester Town Authorities have been in the habit of spending the gas profits on public improvements, and that they have several works of that sort on hand; it is supposed that an increase in rates would not be well received, and therefore, as a matter of expediency, that the gas consumers shall contribute in the future as they have done in the past. The Council of the Manchester Ratepayers Association have passed a resolution to the effect

that the practice of indirectly taxing the gas consumer to provide for the expenditures of the Improvement Committee is wrong in principle; and have thus shown that some correct notions as to justice and fairness still remain in that city. I am glad to notice that some experiments are on hand, having in view the more efficient purification of the Manchester gas, which has long been noted as foul in respect to sulphur compounds to a degree that would not be tolerated in the case of a private undertaking; indeed companies have been brought before the authorities and fined for supplying gas not up to the standard of purity, when, as a matter of fact, the condemned article contained less than half the amount of sulphur that is usually present in the gas supplied by the Manchester Corporation. At Salford the price question was treated much the same as at Manchester. The Improvement Committee wanted the money; the price of gas was not excessively high, etc., etc.

The working statement of the Lancaster Corporation Gas Works, for the year ending June 30th, 1885, is a most interesting document, and comprises every information requisite to enable one to judge of the working. An interesting and unusual feature is a statement showing the cost per ton of coal carbonized during each of the 6 years ended June last, which shows the progress that has been made. In the course of the six years the cost of manufacture has been reduced to the extent of 20 per cent., and the distribution charges have been reduced to a like extent. Public lighting remains about the same, and the amount paid as "Rates and Taxes" has slightly increased. A considerable reduction, amounting to more than 50 per cent., is noticeable under the head of "management." The receipts for products, for the reason above considered, have fallen considerably during the past two years. The ultimate result is that, although the gross price of gas, in 1880, was $1.08, it can now be sold at 80 cents per 1,000 cubic feet, a condition of things which reflects great credit upon the manager, Mr. Armitage. It should be mentioned that, although the nominal price is 80 cents, discounts to the extent of 4 cents is allowed, an additional 4 cents if the consumption is more than 450,000 cubic feet per annum, and a further discount of 12 cents if the gas is used for cooking, heating or motive power. Nearly 73 millions cubic feet of gas have been made during the year, or 10,433 cubic feet for each ton of coal carbonized. Of this quantity 94.2 per cent was sold, 0.67 per cent. used on the works, and 5.12 per cent. is lost by leakage, etc.; 11.15 gallons of tar, and 32 gallons of ammoniacal liquor have been made per ton of coal. Altogether the undertaking furnishes a good example of the results that can be obtained, in a medium-sized works, with good management; and it is noticeable that in several respects they compare favorably with those obtained by the larger undertakings.

## Comparative Evaporation Tests.

The Jarvis Engineering Company, of Boston, Mass., under date of Aug. 1st, published the following circular. We give the figures without comment, and would be pleased to hear from Mr. Upton, of the Jarvis Company, concerning other experiments of a similar nature to those herewith reported:

"The following table embraces report of tests in evaporation made on a tubular boiler set with the Jarvis patent furnace, at the Silver Lake Company's mill, at Newtonville, Mass., and represents a day's work in the use of different kinds of fuel.

"The tests were comparative, all having been made alike; the water and coal were weighed in each test; and the fires were started fresh every morning.

"Claims have recently been made that, at the present low cost of Cumber land bituminous coal, it was cheaper to use it than to use a mixture of screenings and soft coal, but these tests prove the contrary. We have figured the screenings at cargo prices. They can be purchased out of coal yards, and delivered at the mill for one dollar per ton less.

*Report of Tests.*

| | No 1. | No. 2. | No. 3. |
|---|---|---|---|
| Date of test | July 21. | July 22. | July 23. |
| Duration of test | 11h. 12m. | 11 h. | 11h. 10m. |
| Sort of fuel used | Egg. | Cumb. | Cumb'lnd. 480 Screen'gs. 1,600 |
| Total weight of water evaporated | 18,000 | 17,600 | 17,357 |
| Equivalent evaporation from and at 212° | 19,548 | 19,131 | 18,867 |
| Total weight of fuel consumed | 2,415 | 1,954 | 2,080 |
| Total weight of ashes and refuse | 479 | 167 | 263 |
| Total weight of combustible | 1,936 | 1.787 | 1,817 |
| Fuel consumed per hour pr. sq. ft. grate surface | 7.84 | 6.46 | 6.77 |
| Average temperature feed water | 152.48 | 152 | 151.28 |
| Average pressure of steam | 45.63 | 43 | 44.91 |
| Water evaporated per pound of fuel under observed conditions | 7.45 | 9 | 8.34 |
| Water evaporated per lb. of combustible | 9.29 | 9.85 | 9.55 |
| Equivalent evaporation per lb. of fuel from and at 212° | 8.10 | 9.79 | 9.07 |
| Equivalent evaporation per lb. of combustible from and at 212° | 10.10 | 10.70 | 10.30 |
| Cost of fuel consumed in time run, in dollars and cents | 5.38 | 4.45 | 3.58 |
| Lbs. of water evaporated per $1 dollar's worth of fuel from and at 212° | 3,636 | 4,348 | 5,270 |

"Economy of using screening mixture over egg coal, 31 per cent.; economy of using screening mixture over Cumberland coal, 17.5 per cent. Cost of fuel delivered at the mill, including freight, cartage, etc.—egg coal, per 2,240 pounds, $5; Cumberland coal per 2,000 pounds, $4.50; pea and dust coal, per 2,240 pounds, $3.50."

## ITEMS OF INTEREST FROM VARIOUS LOCALITIES.

Reduction in Selling Rates at Worcester, Mass.—At a meeting of the Board of Directors of the Worcester Gas Light Company, held Monday, September 21st, it was determined that the net price for gas should be fixed at $1.80 per thousand cubic feet, the schedule to go into effect from date of January 1st, 1886. This is a concession of 20 cents per thousand from the present scale, and is also the pleasant practical outcome of the manner in which Superintendent Rollins employed his vacation during the last summer. In our issue for Aug. 17th (p. 97) we furnished a hint as to what that gentleman was busying himself with—in the line of reconstruction, alteration, etc., of the Worcester plant—and we may now complete the account by saying that the new furnaces—two of which are on the McIlhenny plan, four on the Dieterich system, and two on the old method—will be fired up about October 15th. If Brother Rollins did not avail himself of his usual midsummer period of rest and recreation, his comparative freedom from anxiety during the coming busy winter season, owing to the different circumstances under which he will find himself placed, when considering the matter of available working plant, as between '84 and '85, will quite likely repay him for his self-denial. No one will gainsay the fact that $1.80 a thousand for gas at Worcester is a low figure.

"Carbolineum Avenarius."—In spite of its appellation, Messrs. Peters, Bartsch & Co., London, England, the patentees of that oddly-named substance, appear to have developed a material possessing particularly good qualities for the preservation of wood. The Editors of the London *Builder*, after explaining that they had subjected a sample of the material to chemical analysis, the result of which was favorable to the substance, state that "Carbolineum Avenarius is an oily fluid of dark brown color, largely made up of tar oils and a proportion of the antiseptic products of the distillation of tar-yielding substances. It is free from dangerous volatility, its boiling point being a high one, so that it can be used with safety under all ordinary conditions. It is a decided antiseptic, and therefore calculated to be of great service in preserving wood from decay and the attacks of insects. Its power in this direction is considerably enhanced, owing to its oily nature, enabling it to penetrate well into the substance of the wood. In one experiment a piece of well-planed deal, ¾ inch thick, was taken and treated with one coating of the composition, which, when dry, was found to have penetrated the wood uniformly to the depth of a little more than one-quarter of an inch. This is an important point in favor of the material, as it removes the necessity for any inconvenient and costly appliances for subjecting the wood under pressure to the action of the composition. The covering power of the material is good, and it dries with reasonable rapidity, 24 to 36 hours being the time which elapsed between the application of the stuff and its absorption by the wood in several experiments where the treated work was freely exposed to the air. For all outdoor and buried woodwork, and for all woods exposed to the action of water, salt or fresh, this substance should be decidedly serviceable. The one objection to its employment for the preservation of woodwork used in the internal construction of buildings is to be found in the fact that wood so treated with it burns more readily and fiercely than if merely painted in the ordinary way, or left entirely untouched. This must be borne in mind; but apart from that, and under circumstances where danger from fire is not a primary consideration, there seems scope for extended use of the material."

The Holder is Completed.—The one and one-quarter million cubic feet capacity gasholder ordered some months ago by the St. Louis Gas Light Company, the contract for the erection of which was secured by the Stacey Manufacturing Company, of Cincinnati, Ohio, has been completed. It is understood that tests on same were most satisfactory.

CHEAPER GAS FOR WALTHAM, MASS.—On date of September 15 Mr. Tarbell, Superintendent of the Waltham Gas Company, gave notice to the people of that city that after first of the present month the selling price of gas would be fixed at $2 per thousand cubic feet on accounts of all consumers who paid their bills at the office of the Company on or before the 15th day of month in which they were presented. Those failing to settle within the stipulated time are to be assessed at the figure of $2.50 per thousand. Mr. Tarbell certainly grants a sufficiency of "days of grace;" and it would seem as though the discount were placed at a figure steep enough to secure the settlement of Waltham gas accounts within the allotted time. The Waltham Company offers to supply burners, shades, gas cookers and heaters, etc., at cost price, and places stress upon the fact that gasoline or vapor stoves can be changed to gas cookers at slight expense. Mr. Tarbell concludes his circular to the Walthamites by remarking, "With these concessions and the very low price for gas we confidently hope for a much larger consumption than at present. By this means alone can the present low price be maintained, or future reductions be anticipated."

AND STILL ANOTHER "CONSTRUCTION COMPANY."—Advices from Albany, N. Y., dated September 19, inform us of the filing of articles of incorporation of a concern hereafter to be known—*i. e.*, while it lives—as the "Empire Gas Works Construction Company, of New York." The incorporators and trustees include Messrs. Reinhold Bocklen, Israel Cook, Edward S. Benedict, and Benjamin H. Woodworth, of Brooklyn, and Robert M. Potter, of Jersey City, N. J. Its objects, as set forth, are the construction and alteration of gas works, and "all business pertaining thereto." Capital stock of company is placed at $500,000, divided into 5,000 shares. We have not the slightest idea as to the ultimate intentions of the "Empire" founders; but, judging from the imposing array of Brooklyn talent represented in the initial directorate, we may be forgiven for indulging in the "guess" that the City of Churches is not unlikely to furnish a future field for the operations of the above-named coterie. We might further opine that the "all business pertaining thereto" portion of the "Empire's" prospectus, or "declaration of intentions," will be likely to receive "particular attention." Many a strange thing has hitherto occurred in Brooklyn gas circles, and the managers of some gas plants in that city are perfectly conversant with the fact that intricate financial ramifications often "pertain thereto," and therein. We suppose the Jersey City capitalist mentioned, in the person of Robert M. Potter, is one of the parties who some years ago were engaged, under the firm name of "R. M. Potter & Co.," in the meter manufacturing business at 14 Morris street, in that city.

"NOTES" FROM DALLAS, TEXAS.—A correspondent writes us in rather a vague manner that a company has been organized in St. Louis, Mo., for the avowed purpose of putting up a new gas plant at Dallas, Texas. He also asserts that the Dallas authorities are about to make a contract with the local Edison Electric Light Company for the lighting of the city's streets under the incandescent system.

THE ENGLISH MARKET FOR SULPHATE OF AMMONIA.—In our "special English correspondence" for this issue of the JOURNAL it will be observed that Mr. Humphrys puts much stress upon the depressed condition of the market for sulphate of ammonia and tar, and rightly surmises that should the present state of affairs continue or progress the English gas maker must soon experience a decided shrinkage in his revenue account—speaking now, of course, with reference to those undertakings that had arranged for the absorption of the bye-products on "long" advance contracts. Mr. Humphrys explains the position quite clearly; and merely by way of reinforcing his comments thereon we append the following extracts from Messrs. Bradbury & Hirsch's "monthly report" on the course of the sulphate of ammonia market during last August: "The month has been a most uneventful one, still the position has puzzled everybody beyond measure. That the 'market' should fall in the face of the nitrate position was certainly not to be expected, and created all the more surprise. Circumstances seem to conspire to keep ammonia reduced to a low level, and unfortunately speculators are not behind in assisting any downward tendency. The demand has been straggling from outward appearances; but a glimpse beneath the surface convincingly showed that it was the way the business was done, rather than the absence of business, which was the conspicuous feature. The shipments are conclusive as to the quanties disposed of, which are quite equal, if not in excess of former years; but makers have not reaped the advantage of the orders, because they had been intercepted by the dealers—that is, the sulphate was sold on speculation, the sellers relying upon being able to bring about a decline to allow them to cover in their transactions at a profit. Thus we are passing through the months of short production even without a sign of the activity which used to prevail at this season of the year."

A NEW GAS COMPANY.—The Mankato Construction Company, which corporation has succeeded to the business privileges, etc., of the firm formerly operating under the title of O. C. McCurdy & Co., is engaged in the work of erecting and equipping a six-inch coal gas plant in the city of Hastings, Nebraska, and it is now expected that everything will be in readiness to introduce gas illumination there on the evening of October 15th. Hastings is the capital seat of Adams County, Neb., and may be easily reached by rail, being located on the Burlington and Missouri River Railroad, at a point where the latter crosses the St. Joseph and Denver City and Republican Valley Roads. It is a growing and important center, being now about number three in rank among the cities of Nebraska, having a population of perhaps 8,000 souls. Our correspondent writes us that, "judging from the manner in which the citizens act towards the new company, they will give the projectors of the enterprise substantial encouragement." The officers of the Mankato Construction Company are the following named gentlemen: L. Patterson, president; C. R. Miller, vice-president; O. C. McCurdy, secretary; John Van Liew, treasurer.

A POSSIBILITY OF A LAWSUIT.—It is just possible that the courts may be called upon to determine the validity of the franchise (bestowed upon certain speculators by the Chicago (Ills.) City Council, and in turn delivered by them to the promoters of the Equitable Gas Light and Fuel Company) lately granted for the construction and maintenance of an opposition gas works in the Lake City. By all means let the suit be instituted; and in case it should, the testimony brought out may be calculated to furnish spicy reading.

THE "BOSSES" WERE CONQUERED.—In our "Item" columns of last issue mention was made of a difference that had "cropped out" between the journeymen plumbers and their employers, with the usual question of an increase in wages as the bone of contention. At the time it seemed as though a "strike" must result, for the employers were loud in their assertion that no advance would be granted in the labor rates, and the employees were equally blatant in announcing their determination to strike if their demands were not acceded to. After a week or two spent in bluster and brag the "bosses" succumbed, and the fight was ended.

GAS MATTERS AT ALBANY, N. Y.—We understand that the Common Council of Albany, N. Y., has granted the projectors of the Municipal Company the right to operate a gas works in that city; but have received no details regarding the same from an authoritative source. Could we call upon Mr. Isaac Battin to supply the "missing links?"

CHEAPER GAS FOR NEBRASKA CITY.—Some time ago Mr. Emerson McMillin succeeded in purchasing a controlling interest in the stock of the Nebraska City Gas Light Company, and shortly thereafter installed Mr. J. M. Murphy as Treasurer and Superintendent of that corporation. When the latter gentleman was placed in charge he knew that quite a "job" had been entrusted to him. The plant was not in the best state of repair or forwardness; the people, as usual, had no great amount of affection for the gas purveyors; and no wonder, either, since they had been charged $4.50 per thousand cubic feet for their gas supply. President McMillin's orders were to "fix the place up," and "cut down the price." We disremember now the exact "cut" first made, but recently have received notification that the first was not intended to be the last, in proof whereof we publish the following circular, published by Treasurer Murphy, on date of Sept. 12th, 1885. Before proceeding further, however, we may remark that even if Nebraska City is located afar in the "Wild West," the printers "out thar" would do credit to any place, since the "circular" is a pretty model of neat and clear typography. As to the information conveyed by it, we submit our readers will conclude that the Nebraska Company "means business"—

"*To the public*:—Under its present management the gas company is entering upon its third year in this city. As you are well aware when we came among you we revived a business that had long been inert, and invested a large capital in anticipation of encouragement which we have never received. This lack of support has been the cause of much conjecture on our part, when it is a fact that we are to-day furnishing the citizens of Nebraska City with gas second to none in illuminating power and purity, and at a marvellously low price—much less than rates charged by any other company in the West, when the size of the city and number of consumers are considered. As we are upon the threshold of the season of early darkness, and consequent use of more artificial light, and in view of the fact that all other means have failed to bring us a liberal consumption of gas and returns commensurate with the outlay of capital, our president has ordered promulgated the following schedule of prices to take effect immediately on all gas consumed in any one calendar month:

"One thousand feet and under that quantity, $3 per thousand; over 1,000 to and including 2,000, $2.90; over 2,000, $2.80; over 3,000, $2.70; over 4,000, $2.60; over 5,000, $2.50; over 6,000, $2.40; over 7,500, $2.30; over 10,000, $2.25; over 20,000, $2.20; over 50,000, $2.05; 60,000 feet and over, $2 per thousand cubic feet.

"We cannot but feel that this concession will be substantially appreciated, and that we will have your hearty co-operation in our endeavor to make gas in Nebraska City a necessity, not a luxury. If we meet with the encouragement due us it will inure to the consumers' benefit, inasmuch as a liberally increased consumption is the precursor of future lower prices." To all of which we would say, "Keep it up, Mr. Treasurer; and let there be no deviation from the proposed policy."

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Personal.—Mr. Thomas R. Brown, formerly engineer-in-chief of the Philadelphia, Pa., Gas Trust, is now engaged in "making a trip around the world;" but instead of expecting to compass the journey within the limit of time set by Jules Verne's 80-days tourist, the genial engineer calculated that he would be fourteen months older upon his return to the City of Brotherly Love. Two months out of the fourteen have been blotted out of the calendar since his departure, and when last heard from his address was "Alaska, U. S.;" which is rather suggestive of over-condensation. We wish him a pleasant trip.

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Notes from Chicago, Ills.—Mr. Forstall is "as busy as a bee" attending to details in connection with the improvements and extensions now in progress of execution at the works of the Chicago Gas Light and Coke Company. Among the items of new plant we note that P. H. & F. M. Roots, of Connersville, Ind., will put in one of their "No. 6" exhausters, and the American Meter Company will erect a 14-ft. station meter. The Peoples Company, of same city, is up and doing, one of their additions to plant being the placing of a 12-ft. station meter. Next in order comes the Hyde Park Gas Company, with a long list of new construction. At the two last-named works, as in the case of the old Chicago Company, the American Meter Company will erect the station meters.

---

They Would Not Consider the Petition.—The city fathers of the town of Elgin, Ills., are, to say the least, a most peculiar collection of custodians; but, of course, real matter for wonder would exist only in case did they present an exception to the general run of councilmen. Some time ago Elgin had the electric fever in its most rabid form, and the councilmen acting, as they said, "in answer to general public sentiment," determined that the streets should be illuminated entirely by electricity, in order that other and contiguous boroughs might not cast reproach upon them for their "backwardness in appreciating the advancing spirit of the age." The "spirit of the age" was seized upon to such an extent that right speedily a contract between the local magnates and the home electric lighting company was executed, and by its terms the latter agreed to do the night lighting of the streets, while the former bound themselves to pay, in compensation therefor, out of the public treasury, a sum of money more than double that formerly paid to the Elgin Gas Company for doing the same work—this last is a mistake, since it is really a fact that the gas company, while receiving less than half the amount paid the electrical promoters, rendered, for the smaller sum, a much more satisfactory lighting service. Almost from the beginning of the electric order of illumination complaints were made as to its inadequacy, etc.; but the council paid no attention to them, although it is on record, we believe, the members asserted that "in the course of time the system would please the ratepayers better, as the folks in charge of the electrical display were constantly advancing in the matter of improvement, etc." The "advance in improvement" was such that early in September the business men and taxpayers of Elgin, to the number of 75 or more, presented a formal petition to the Mayor and Council in which it was asserted that the present system of street lighting was unsatisfactory to the people; that the contract with the city was not faithfully carried out; that the system was too expensive, and concluded with the request that either the contract be rigidly enforced or at once terminated. The petition was read at Council meeting of September 15th, and Alderman Welsby, from light committee, promptly replied that the question of "more light" had been under consideration for several weeks, coolly adding thereto, "the committee was already in communication with the electric light company." Next in order came a motion to place the petition on the table, which motion received immediate affirmative action. Before the meeting adjourned Friend Welsby smilingly floated to the surface once more, and explained that if the city would expend "about" $100 for "a mast and double lamp on the East Side Park, the electric light company would furnish, without cost, light for same during continuance of present contract." Welsby illustrated his proposition by handing in a "sketch of the proposed mast;" and when the same had been duly inspected the Chairman referred the proposition to the "light committee for report." In the meantime the petitioners are smarting under the treatment received at the hands of their servants (?), and while they remain in this mood perhaps some one or more of them may be tempted to institute an investigation that will have for its object a determination of the number of shares held by Welsby and his associates in the capital stock of the Elgin Electric Light Company.

Deaths from Gas Inhalation.—Two well-dressed men, each registering as Mr. Davis, engaged a room at Smyer's Hotel, 35 Bowery, this city, late on evening of Tuesday, September 8th. One was stout, while the other was slender. On Wednesday morning they left the hotel together. On evening of same day the stout Davis returned and engaged room 4. His companion called the following morning, and asked "if Mr. Davis was up yet." A negative answer being returned, the questioner replied, "All right; do not wake him," and then departed. At 4:30 P.M. gas was discovered escaping from room No. 4, and a forced entrance revealed the fact that Davis had been suffocated. On the bosom of his outer shirt had been written in pencil, "Another mysterious case that will baffle the police." Everything pointed to a case of deliberate suicide. His companion has not since been heard from. The second case is that of Joseph C. Fisher, formerly a resident of New Brunswick, N. J., but latterly an inmate of the Pierrepont House, Brooklyn, N. Y. On the morning of Sept. 10th an escape of gas into the corridors of that hotel was traced to the room occupied by Fisher. When the discovery was made, although the room occupied by deceased was filled with gas that had escaped from a turned-on burner, some asserted that Fisher had succumbed to alcoholism, but an autopsy made by Dr. Shepard proved that death had, in the language of the doctor, "resulted from blood poisoning caused by inhaling illuminating gas." The Brooklyn *Eagle* claims that Fisher committed suicide. The last case is one that occurred about a fortnight ago at New Castle, Pa.; but we have received no details regarding the same.

---

Passed over the Mayor's Veto.—At a meeting of the Utica (N. Y.) Common Council, held Sept. 18th, a communication from the Mayor, vetoing a prior resolution of Council directing that the Mayor and City Clerk enter into a contract with the Utica Gas Light Company for the lighting of 734 gas lamps, was read. After discussion the resolution was passed over the veto by a vote of 9 to 3.

---

To Take Charge at Minneapolis, Minn.—Mr. V. L. Elbert, who has been Superintendent of the Jackson (Mich.) works for some years past—and a right good one at that—took charge of the Minneapolis plant about October first. While we can congratulate the Minneapolis folks on securing Mr. V.'s services, we feel we must do so at the expense of the Jackson company's managers. However, no one can blame Elbert much for "mounting upon another rung of the ladder."

---

More Comparative Evidence.—Note the difference in the nature of the two gases as evidenced by the following. Water gas is supplied to the New England Hotel, while coal gas is the illuminant employed at the Walker House. The evening papers of September 25th chronicle the fact that on the night of 24th, a middle-aged man, clad in the garb of a respectable mechanic, paid for a room at the New England Hotel and registered as John McGee. The smell of gas led the hotel people to his room on the following morning, and the occupant not replying to their summons, the apartment was opened by force. Mr. McGee was found in an unconscious condition, and his death ensued before the physicians arrived. In fact his demise occurred before the ambulance (which had been telephoned for immediately upon discovery of the patient's critical state) appeared on the scene. The newspapers add, "He had blown out the gas before retiring." That is the water gas section of the "deadly parallel;" and next comes the coal gas portion of the comparison, which is reprinted from the columns of the New York *Daily Times*, date of Sept. 19th: "The young lady who was found unconscious on Thursday in one of the rooms of the Walker House, at Port Chester, Westchester County, from the effects of an inhalation of escaping gas, recovered yesterday, and went to her home. Her name is Kate Daley, and her father is gardener for a Mr. Ward, of the firm of Russell, Burdsall & Ward, at Glenville, Conn. She said she was not accustomed to gas, and had blown it out instead of turning it off. She had been 17 hours in the room, and during all that time the burner cock attached to a gas burner, passing four cubic feet of gas per hour, had been turned full on." The above instances are surely plain enough, and need no comment.

---

The Utica (N. Y.) Street Lighting Contract.—Elsewhere in our current "item columns" will be found a statement that the Utica Common Council ordered, over the veto of the Mayor of that city, that the authorities enter into a contract with the Utica Gas Light Company for the lighting of the streets for ensuing year. Later information conveys the news that the contract has been signed, and by its terms the Utica company is to receive the sum of $17,996 as compensation for maintaining 734 gas lamps for the twelvemonth, the company also to receive $24.70 per annum for each additional lamp over the stipulated total of 734.

---

A Five-Man Power Gas Engine.—The *Gas Engineer* says that Messrs. Crossley Bros., of Manchester, have just brought out a five-man power gas engine in answer to the great demand for a motor of that capacity. It is quite silent in action, and is fitted with a newly patented pendulum governor. The engine, like every piece of apparatus manufactured by that firm, is of good design and perfect workmanship, and does not take up any unnecessary space when placed in position.

## Gas Stocks.

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16 Wall St., New York City.

October 2.

☞ All communications will receive particular attention.

☞ The following quotations are based on the par value of $100 per share.

| | Capital. | Par. | Bid | Asked |
|---|---|---|---|---|
| Consolidated | $35,430,000 | 100 | 97½ | 98 |
| Central | 440,000 | 50 | 60 | 70 |
| " Scrip | 220,000 | — | 47 | 57 |
| Equitable | 2,000,000 | 100 | 128 | 133 |
| " Bonds | 1,000,000 | — | 107 | 110 |
| Harlem, Bonds | 170,000 | — | — | — |
| Metropolitan, Bonds | 658,000 | — | 110 | 113 |
| Mutual | 3,500,000 | 100 | 134 | 135 |
| " Bonds | 1,500,000 | 1000 | 104 | 107 |
| Municipal, Bonds | 750,000 | | — | — |
| Northern | 125,000 | 50 | 50 | — |
| " Scrip | 108,000 | | | |
| Gas Co's of Brooklyn. | | | | |
| Brooklyn | 2,000,000 | 25 | 129 | 131 |
| Citizens | 1,200,000 | 20 | 84 | 86 |
| " S. F. Bonds | 320,000 | 1000 | 106 | 110 |
| Fulton Municipal | 3,000,000 | 100 | 159 | 160 |
| " Bonds | 300,000 | | 104 | 108 |
| Peoples | 1,000,000 | 10 | 85 | 86x |
| " Bonds | 290,000 | — | 105 | 110 |
| " " | 250,000 | — | 90 | 95 |
| Metropolitan | 1,000,000 | 100 | 94 | 96 |
| Nassau | 1,000,000 | 25 | 125 | 127x |
| " Ctfs | 700,000 | 1000 | 98 | 99 |
| Williamsburgh | 1,000,000 | 50 | 155 | 160 |
| " Bonds | 1,000,000 | — | 111 | 114 |
| Richmond Co., S. I. | 300,000 | 50 | 64 | 75 |
| " Bonds | 40,000 | — | — | — |
| Out of Town Gas Companies. | | | | |
| Buffalo Mutual, N. Y. | 750,000 | 100 | 80 | 85 |
| " Bonds | 200,000 | 1000 | 95 | 100 |
| Citizens, Newark | 918,000 | 50 | 103 | 115 |
| " " Bonds | 124,000 | — | 105 | 110 |
| Chicago Gas Co., Ills | 5,000,0000 | 25 | 130 | 140 |
| Peoples G. L. & C. Co., Chicago, Ills | | | 8 | 12 |
| Cincinnati G. & C. Co. | | | 180 | 182 |
| Consolidated, Balt. | 6,000,000 | 100 | 47 | 48 |
| " Bonds | 3,600,000 | | 107 | 107½ |
| Central, S. F., Cal. | | | — | 58 |
| Capital, Sacramento, Cal. | | | 56 | — |
| Hartford, Conn | 750,000 | 25 | 123 | 129 |
| Jersey City | 750,000 | 20 | 145 | — |
| Laclede, St. Louis, Mo. | 1,600,000 | 100 | 100 | 105 |
| Louisville, Ky | 1,500,000 | 50 | 95 | 100 |
| Montreal, Canada | 2,000,000 | 100 | 181 | 182½ |
| New Haven, Conn | | 25 | 166 | 170 |
| Oakland, Cal | | | 29 | 30 |
| Peoples, Jersey City | | — | 45 | — |
| " " Bonds | | | — | — |
| Paterson, N. J | | 25 | 90 | — |

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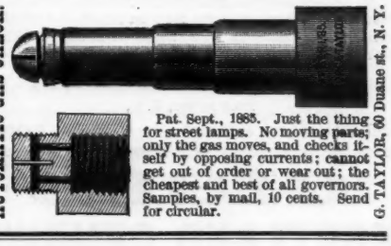


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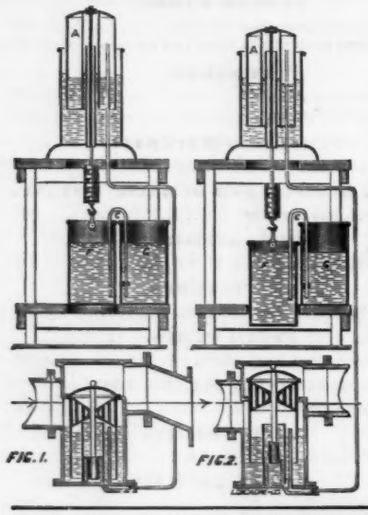


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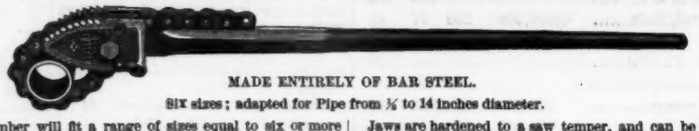

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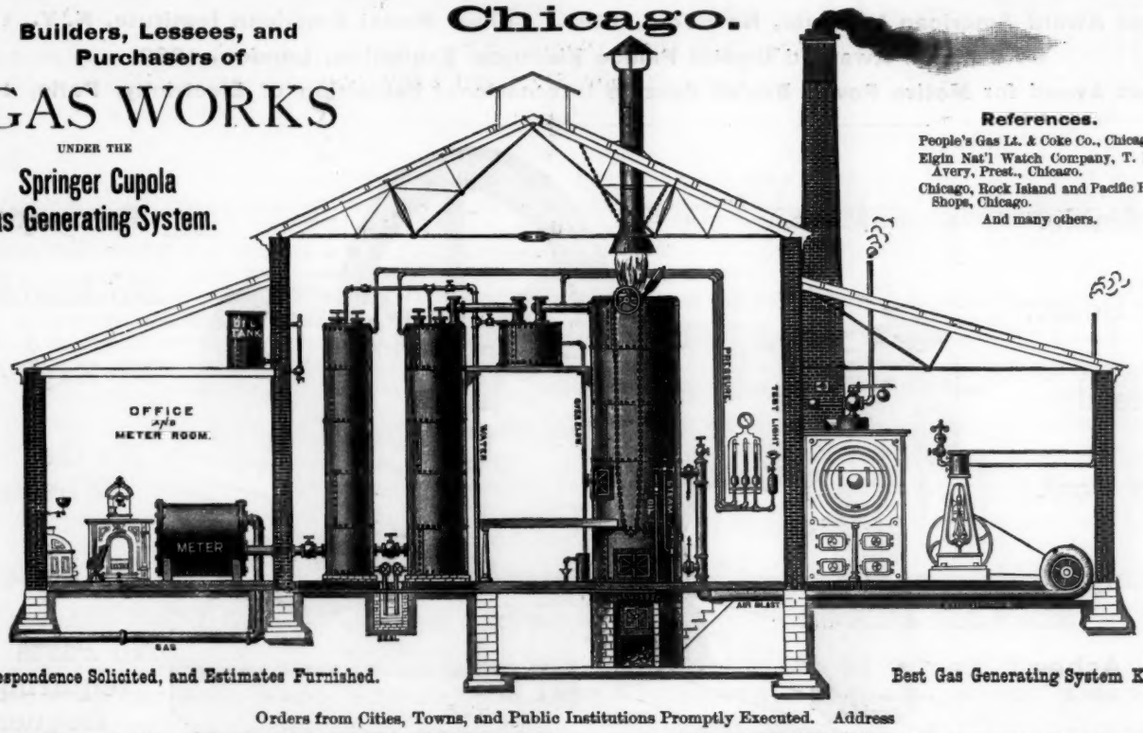


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---

# Pipe Coverings.

**Fireproof, Non-Conducting Coverings for**

**STEAM PIPES, BOILERS,**
**And all Hot Surfaces.**

Made in sections three feet long. Easy to apply; light and cheap.

**Asbestos Materials, Fibre, Braided Packing, and Cement.** These goods are used at Continental Works, Br'klyn.

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# THE CLERK GAS ENGINE.

**Highest Award American Institute, New York, 1883. Silver Medal American Institute, N. Y., 1884.**
**Gold Medal Awarded Crystal Palace Electrical Exhibition, London, 1882.**
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Reliable.

No Boiler.

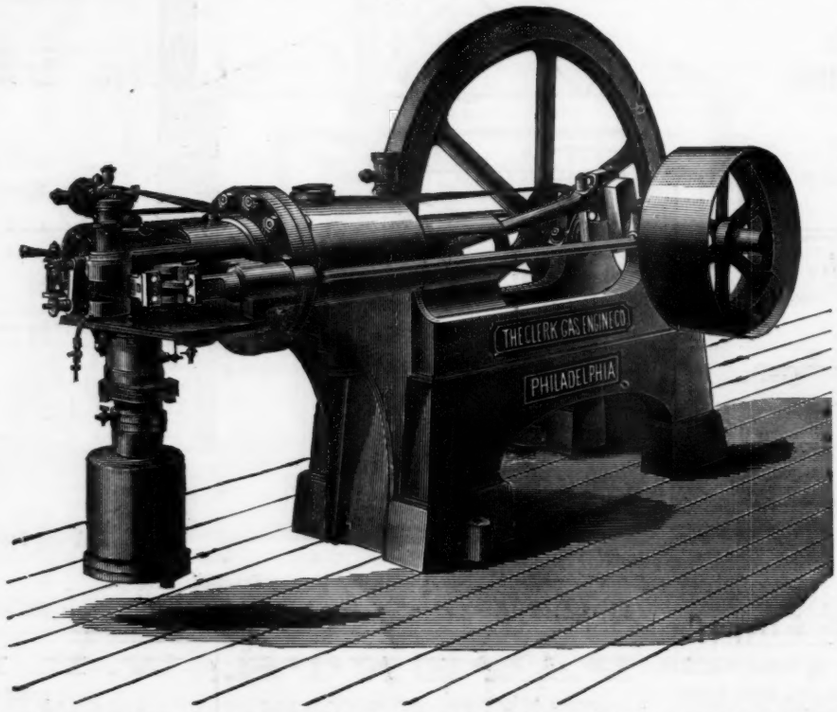
Steady.

No Coal.

Simple.

No Ashes.

Compact.




Economical.

No Engineer.

No Explosion

No Gearing Wheels.

No Danger.

No Parts requiring frequent renewal.

**REQUIRING ONLY A MATCH TO START IT--GIVING ITS FULL POWER IMMEDIATELY.**

We would inform the public that during the last few months we have improved THE CLERK GAS ENGINE to such an extent that we can now offer an engine vastly superior to our former pattern. These improvements have enabled us to sell our engine at a GREATLY REDUCED FIGURE, partly on account of the decreased weight (our engine weighing about half that of others giving the same Brake H. P). The consumption of gas has been decreased to a considerable extent, and the Brake H. P. has been increased some 25 to 30 per cent. All parts of the old design that were considered defective have been remodeled and new designs added. We now have an engine second to none as regards power, consumption, and ease of working. With our new engine all trouble in starting has been removed, the noise reduced to a minimum, and the regularity of motion is now all that can be desired. We guarantee all we claim for it, and the material and workmanship being of the best, enables us to guarantee the engine for twelve months.

**SOLE MAKERS,**

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**WM. W. GOODWIN, President. E. STEIN, Secretary. S. LEWIS JONES, Asst. Secretary. L. P. GARRET, Supt.**

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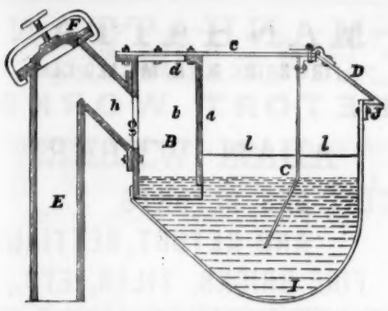


## Boardman Hydraulic Main,

Patented October 7, 1884.

For description, see AM. GAS LIGHT JOURNAL of Feb. 2, 1884.
For terms, apply to

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Gas Companies and others intending to erect lamps and posts will do well to communicate with us.

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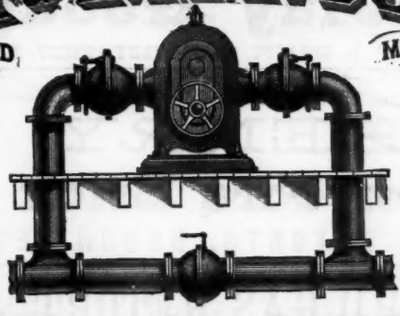

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WITH ENGINE ON SAME BED PLATE, OR WITHOUT.

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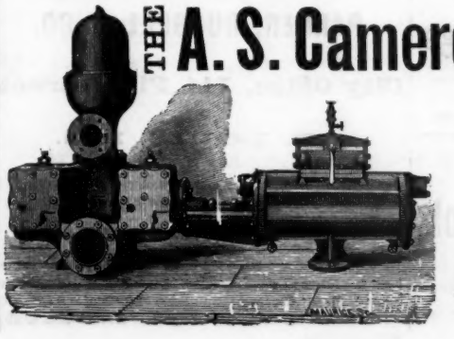

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Upward of 30,000 in Use.

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**Ever Introduced.**

**Adapted to Every Possible Duty.**

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AND EVERYTHING IN THE FIRE CLAY LINE.

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**Clay Retorts and Settings.**
BLOCKS & TILES
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We have studied and perfected three important points. Our retorts are made to stand changes of temperature, the strongest heats of the furnace, and the abrasion of feeding and emptying. Our customers are in almost every State of the Union, to all of whom we refer.

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**Clay Retorts, Blocks & Tiles,**
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Red and Buff Ornamental Tiles and Chimney Tops. Drain and Sewer Pipe (from 2 to 30 inches). Baker Oven Tiles 12x12x2 and 10x10x2.
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**Large Flat Flame Burners.**
15 cts. each, $1.50 per doz.

A test with these burners, with 18-can. gas, gives the following results:

| No. | Pressure. | Consump. per H'r | Candle Power |
|---|---|---|---|
| | | Cu. Ft. | |
| 20 | 1.00 in. | 7.75 | 33.00 |
| 30 | 1.00 in. | 9.90 | 42.50 |
| 40 | 0.85 in. | 10.20 | 44.54 |
| 60 | ..... | ..... | ..... |

BURNER, by use of which Gasoline Stove is changed to Gas Stove.

Gasoline Stove.

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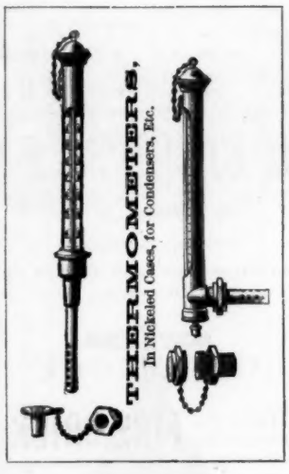
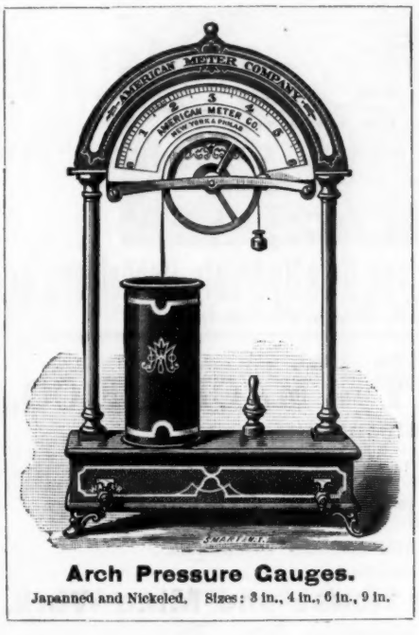


**THERMOMETERS,**
In Nickeled Cases, for Condensers, Etc.




**Arch Pressure Gauges.**
Japanned and Nickeled. Sizes: 3 in., 4 in., 6 in., 9 in.

SIPHON
**Pressure Gauges.**

| | |
|---|---|
| 4 inch, | Nickeled. |
| 6 inch, | " |
| 8 inch, | " |
| 10 inch, | " |
| 12 inch, | " |
| 14 inch, | " |
| 16 inch, | " |
| 18 inch, | " |
| 20 inch, | " |
| 24 inch, | " |

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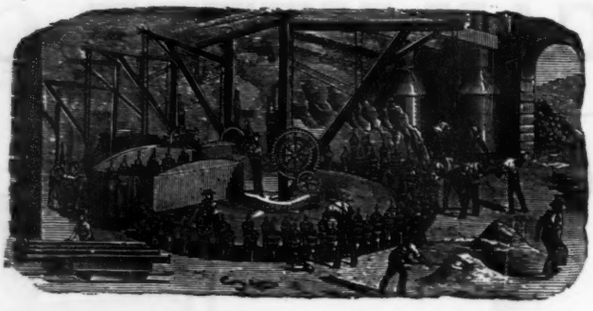

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FROM TWO TO FORTY-EIGHT INCHES DIAMETER.

ALSO ALL SIZES OF

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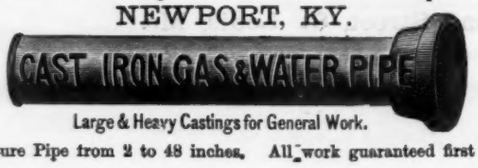


Large & Heavy Castings for General Work.

Branch AND SPECIAL CASTINGS FOR GAS & WATER CO'S.

Manufacture Pipe from 2 to 48 inches. All work guaranteed first quality.

# Mellert Foundry and Machine Co.

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Specials—Flange Pipe, Valves and Hydrants, Lamp Posts, Retorts, etc.

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# Gas and Water Pipes,

From 2 to 48 Inches in Diameter.

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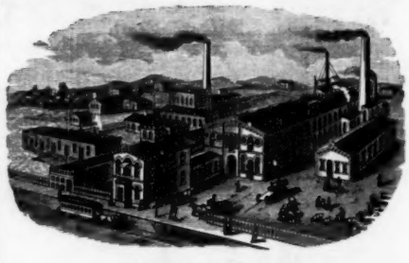

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Hydraulic Main Dip Regulators, also Check Valves, Foot Valves, Yard-wash and Fire Hydrants.

Send for Circulars.

Valves.—Double and Single Gate, ¾ in. to 48 in., outside and inside Screws. Indicator, etc., for Gas, Water, Steam, and Oil.

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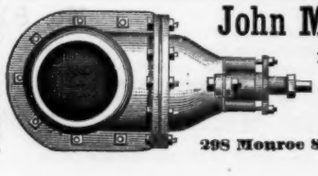

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# Siemens's Regenerative Gas Burners,

## For Lighting and Ventilating.

THE CHEAPEST, PUREST, AND MOST BRILLIANT OF ALL GAS LIGHTS.

**Superior to the Electric Light in Economy, Beauty, & Steadiness.**

SPECIALLY ADAPTED FOR LIGHTING HALLS, FACTORIES, OPEN SPACES, ETC.

Numerous Tests made by various Gas Companies in the United States show an Efficiency of Ten Candle Power per Cubic Foot of Gas.

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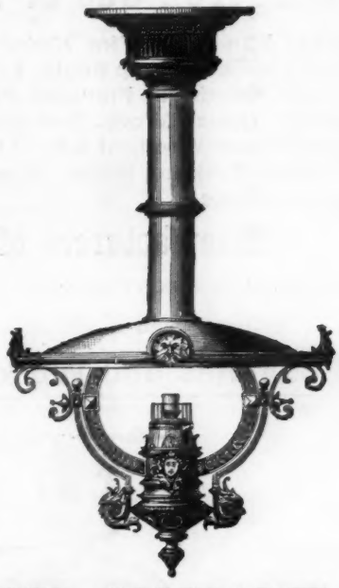
**W. D. COLT, - - - - 1420 F Street, Washington, D. C.**
**JOHN KIEFER, - - - 344 Lawrence, Street, Denver, Col.**



## THE SIEMENS REGENERATIVE GAS LAMP COMPANY,

**SOLE MAKERS FOR THE UNITED STATES,**

**N. E. Cor. 21st. St. and Washington Av., Philadelphia, Pa.**

# THE "STANDARD" WASHER-SCRUBBER,

**KIRKHAM, HULETT & CHANDLER'S PATENT.**

**Total Capacity per 24 Hours of "Standard" Washers Ordered During the Following Years.**

| | |
|---|---|
| 1877 | 4,000,000 cubic feet. |
| 1878 | 4,750,000 " |
| 1879 | 24,545,000 " |
| 1880 | 42,907,500 " |
| 1881 | 36,462,500 " |
| 1882 | 30,300,000 " |
| 1883 | 57,735,000 " |
| 1884 | 26,177,500 " |
| Total | 235,937,500 cubic feet. |

**Total Number and Capacity per 24 Hours of "Standard" Washers Erected and in Course of Erection in the Several Countries**

| | Number. | Cubic Feet per Day. |
|---|---|---|
| Great Britain | 151 | 157,070,000 |
| Western Hemisphere | 38 | 39,337,500 |
| Australia | 18 | 12,150,000 |
| New Zealand | 2 | 650,000 |
| France | 6 | 4,550,000 |
| Belgium | 8 | 5,420 000 |
| Germany | 16 | 8,200,000 |
| Holland | 4 | 4,160,000 |
| Denmark | 1 | 150,000 |
| Russia | 2 | 3,500,000 |
| Spain | 1 | 350,000 |
| India | 1 | 400,000 |
| Total | 248 | 235,937,500 |

**THE CONTINUED POPULARITY**

**Of these Machines**

Will be recognized from the following extracts from letters from representatives of some of the companies having them in use:

PROVIDENCE GAS COMPANY,
PROVIDENCE, R. I., Nov. 24, 1884.

GEO. SHEPARD PAGE, Esq., New York:

Dear Sir—We are now using less than a gallon of water per thousand in the "Standard," and the gas at the outlet will not color turmeric paper.

Yours etc.,
A. B. SLATER, Treasurer.

PORTLAND GAS COMPANY.
PORTLAND, ORE., Nov. 29, 1884.

GEO. SHEPERD PAGE, New York:

Dear Sir—Our Scrubber appears to run to our entire satisfaction, and we are pleased to say that it takes out all the ammonia from the gas. This is *very* satisfactory to us, as we were ruining our meters at a fearful rate heretofore. The amount of water used is very inconsiderable as compared with our old process. The machine runs very smooth and still. Very respectfully,

H. C. LEONARD, Secretary.

**"Standard" Washers Ordered Recently.**

| | Cu. Ft. per Day |
|---|---|
| Anneberg Gas Co | 200,000 |
| Bombay Gas Co | 400,000 |
| Brussels Co | 1,250,000 |
| CHICAGO, two, 1,000,000 each | 2,000,000 |
| Chemnitz Gas Co | 1,000,000 |
| CITIZENS GAS CO., BUFFALO | 750,000 |
| Coke Works in Zabre, Ober-Schlesien | 1,500,00 |
| Cokerei der Friedenshutte, Upper Silesia | 00,000 |
| Dumfries Corporation | 250,000 |
| Dunedin Gas Co., New Zealand | 400,000 |
| GEORGETOWN, D. C | 250,000 |
| King's Lynn Gas Co | 300,000 |
| Leiden, Holland | 600,000 |
| Lincoln Gas Co | 400,000 |
| Liverpool Gas Co | 2,000,000 |
| " " | 3,000,000 |
| LOUISVILLE GAS CO | 1,500,000 |
| Numea Gas Co | 100,000 |
| PITTSBURGH GAS CO | 1,500,000 |
| PAWTUCKET, R. I | 500,000 |
| PORTLAND GAS CO., Oregon | 562,500 |
| SAN FRANCISCO GAS CO | 4,000,000 |
| Sheepbridge | 40,000 |
| ST. LOUIS GAS CO | 2,000,000 |
| Sydney Gas Co | 2,500,000 |
| WASHINGTON, D. C. GAS CO | 2,000,000 |
| Whitchurch Gas Co | 175,000 |
| Total | 29,677,500 |

## GEO. SHEPARD PAGE, No. 69 WALL STREET, NEW YORK,

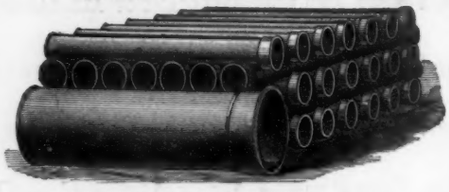
**SOLE AGENT FOR THE WESTERN HEMISPHERE.**

# R. D. WOOD & CO.,

400 Chestnut Street, Phila., Pa.

## Cast Iron Gas & Water Pipe, Water Machinery & Gas Apparatus

**Cast Iron Pipe, Fire Hydrants, Eddy Valves, Lamp Posts, Large Loam Castings, Flanged Pipe, Sugar House Work, Iron Roofs and Floors, Wrought & Cast Iron Tanks, Turbine Water Wheels and Pumps.**



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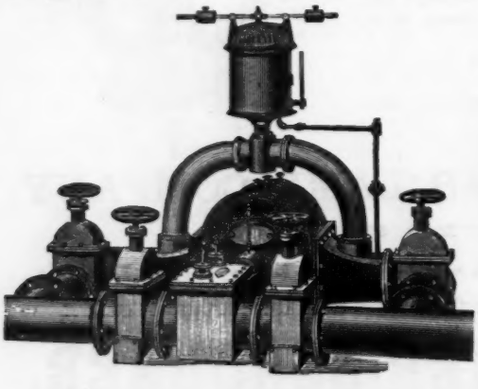
**Manufacturers of Heavy Castings and Machinery of Every Description.**

ENGINEERS & CONTRACTORS FOR THE ERECTION OF GAS WORKS, & ALL MACHINERY CONNECTED THEREWITH

Estimates and specifications furnished for erection of new works or the extension or alteration of old ones.

**Foundries and Works. - - Millville, Florence, and Camden, N. J.**



## SMITH & SAYRE MFG. COMPANY,

G. G. PORTER, Prest. *245 Broadway, N. Y.* CHAS. W. ISBELL, Sec'y.

## Machinery & Apparatus for Gas Works

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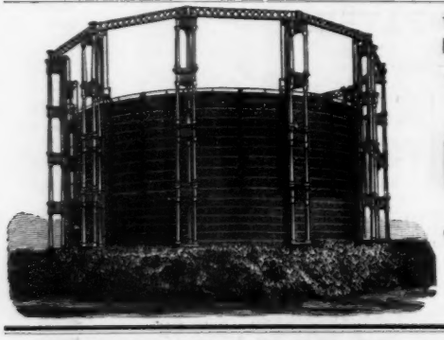

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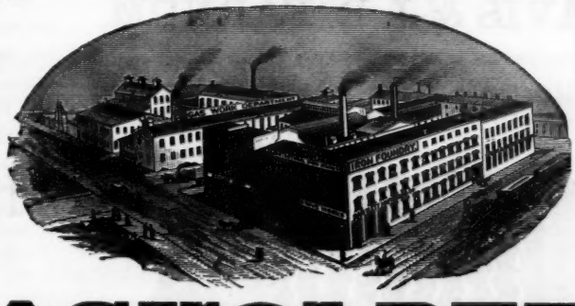

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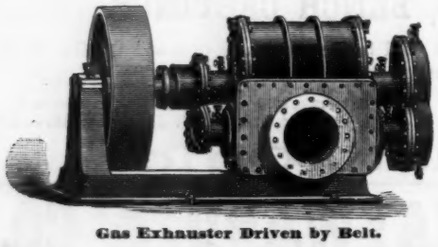

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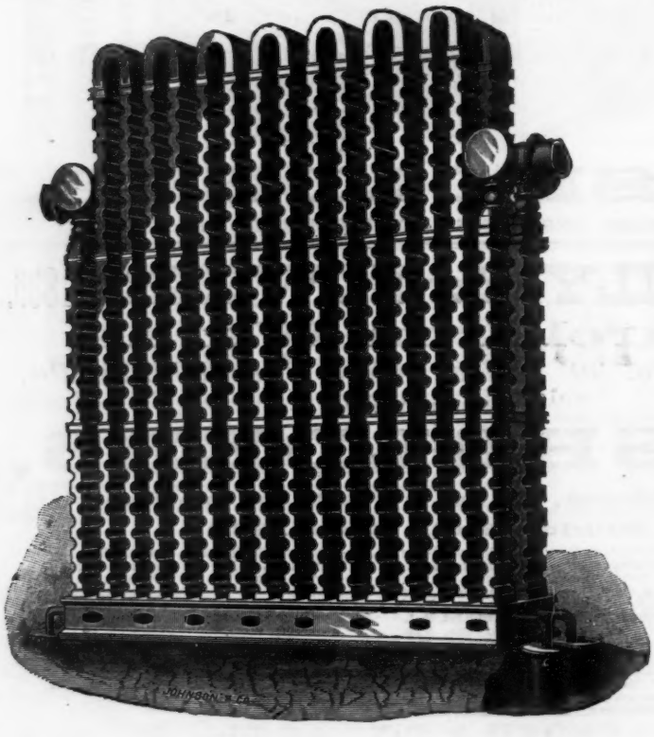

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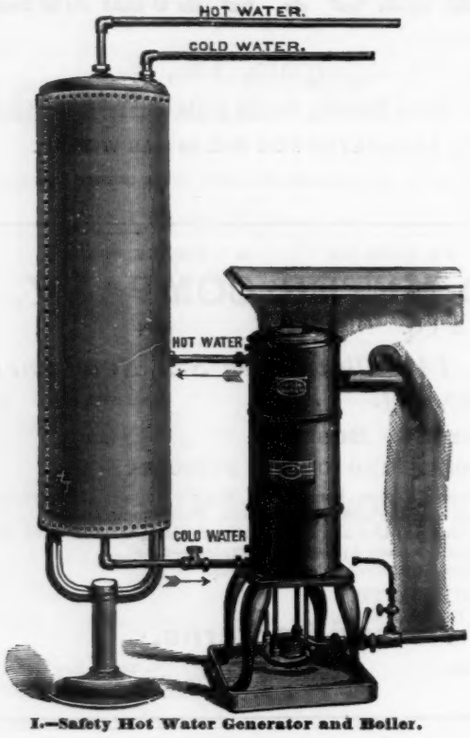


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II.—Gas Cooking Stove No. 8 B.

### Safety Hot Water Generator and Boiler.

Cut I. represents our Safety Gas Hot Water Generator and Boiler, arranged for home use. This most easy, quick, and economical way of preparing a warm bath, or for heating water for any omestic purpose, entirely supersedes any necessity for the use of ranges or stoves—a great comfort, particularly in hot weather. The boiler being self-filling, as the hot water is drawn off, can never become empty, thus preventing the possibility of any accident.

We beg to call attention to the cast iron pan which is now attached to the legs of the Generator (see illustration). This is to catch the drippings from the Coil, which many persons suppose come from a leak, when in fact they are produced by condensation. This condensation is caused by the hot flame coming in contact with the coil filed with cold water.

### New Style Gas Cooking Stove.

Cut II. represents our New Style Cooking Stove. As will be seen, it has an ornamented cast iron base and front, and extension shelves. The oven burner, which is atmospheric (unless otherwise ordered), is of an entirely new and improved pattern (patent applied for). The ovens are of greater capacity than those of the old style. The top, in conjunction with the outlet pipe, is designed to carry off all products of combustion; hence the outlet pipe must be connected with a flue, or the stove will not work properly.

This Stove has 4 boiling burners in top of hot plate. All fittings are nickel plated. We are making this style of Cooking Stove in the following sizes—viz., No. 7 B, No. 8 B, No. 9 B, and No. 10 B.

III.—Improved Hot Plate, No. 108.

## New Style Hot Plates.

Cut III. represents our New Style of Hot Plates, of which we are making No. 106 (two small boiling burners), No. 107 (two medium sized boiling burners), and No. 109 (two medium and one large boiling burner). See new Catalogue and Price List for further particulars.